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JOURNAL

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ROYAL HORTICULTURAL SOCIETY.

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PART I.

FRUIT GROWING IN CALIFORNIA.

By SIDNEY C. LAMB, F.R.H.S.

GEOGRAPHICALLY considered, California is one of the most favoured districts on the American continent. The Pacific Ocean washes its entire western shore. To the east lie several lesser ranges of mountains, backed up by the Rockies. The Oregon State line is a continuation of California northward, while to the south, genial and balmy Mexico abuts in such a friendly way that the traveller must needs inquire where one country ends and the other begins. Thus it is that, tempered by warm trade winds from the ocean, and lofty mountain ranges protecting us from the East—where the land is frozen in winter and scorched in summer—Nature has smiled upon us and placed every possible need of mankind within our reach.

The early history of California is so closely interwoven with romance and uncertainty as to be in a sense surrounded by mystery. The ruins of ancient Aztec architecture indicate a remote civilisation of which we know hardly anything, and while students have endeavoured to trace connections along our

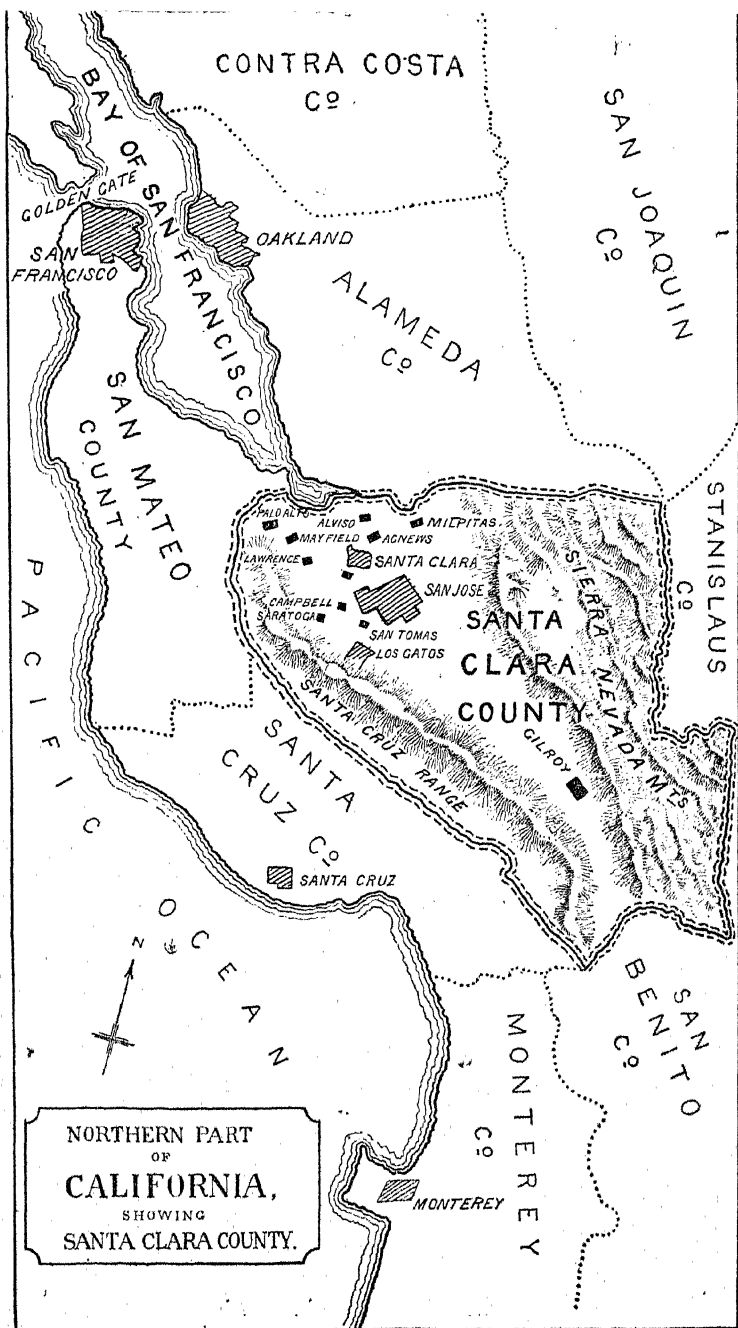
western coast line from North-eastern Russia, across Behring Strait, their researches have not been satisfactory. On the other hand, ethnological evidences everywhere prevail in the south. Ruins, races, customs, civilisation, and religion all point to the habitation of California by the Spanish. It was not until April 11, 1769, that the first white settlers arrived and settled in San Diego, California. On July 16 of the same year some Franciscan friars, under Father Junipero Serra, founded a mission at that place.

Between this date and 1823 no less than twenty-one missions were founded in various portions of the State, and with them came the first European civilisation. Events followed rapidly from this date. From a grazing, pastoral country, the discovery of gold, in 1847, led to immediate and unprecedented immigration, until in 1850, the State of California was formally admitted to the Union. Its rapid strides since that period are too well known to need mention here. Cities and towns abound; prosperity reigns; our future looks bright beyond compare. The county which deals more particularly with our subject is that of "Santa Clara," the county which has been termed the land of "Sunshine, Fruit, and Flowers."

Santa Clara is situated in one of the most delightfully attractive districts of the State. (Fig. 1.) An arm of San Francisco Bay and Alameda County bound it on the north; Stanislaus and Merced Counties on the east; San Benito County on the south-east; while to the south-west and west lie Santa Cruz and San Mateo Counties. Just inland enough to soften any possible ocean winds that may prevail, being separated from the ocean by the Santa Cruz or "coast range" of mountains on the west, the north breeze from the bay renders the warmest days of summer unoppressive, the mercury rarely rising above 90 degrees, and hardly ever falling below 35 degrees, with a mean temperature of about 60 degrees Fahrenheit. It contains in round numbers 1,000,000 acres of land, of which about 250,000 acres lie in the valley, some 300,000 acres in rolling hills and slopes, the remainder being mountains, some rough and wooded, some full of springs and running streams, and abounding in many kinds of game and mountain trout. Of our climate, temperature, soils, products, &c., full information will be found under their respective heads elsewhere. Suffice it

here to state that we have room for a million people, but only want the best. Of our seasons it may be said we have but two, "wet" and "dry," though the terms are misleading and convey impressions foreign to the facts. The following "pen picture" of our procession of the seasons, written by the late Judge Belden, is so true and terse that I think I may be pardoned if I present it here entire.

"Beginning with the month of October, the signs of a coming change are apparent. The winds, no longer constant from one quarter, become variable both as to direction and force, or wholly cease. Sudden blasts raise miniature whirlwinds of dust and leaves which troop over the fields, and the stillness of the night is broken by fitful gusts and the sudden wail of the trees, as the breath of the coming winter sweeps through them. These are the recognised precursors of the season's change, and are usually followed in the first ten days of October by an inch or more of rain, and this, usually, by weeks of the finest weather. The effect of these first rains is magical. The dust is washed from the foliage, and is laid on the roads and fields. The air has a fresh sparkle and life. The skies are of a deeper azure, and the soft brown hills seem nearer and fairer than before. It is the Indian summer of the East; but, instead of the soft lassitude of the dying year, here it comes with all the freshness and vigour of the new-born spring. If in this and the succeeding months there are further showers, the grass grows up on every hand, and the self-sown grain in all the fields. The hills change their sober russet for a lively green. Wild flowers appear in every sheltered nook. Hyacinths and crocuses bloom in the gardens, and the perfume of the violet is everywhere in the air. In the latter part of November the rainy season is fully established. A coming storm is now heralded by a strong, steady wind, blowing for a day or two from the south-east, usually followed by several days of rain, and these are succeeded by days or weeks without a cloud—and thus alternating between occasional storms and frequent sunshine is the weather from October to April—the rainy season in California. The amount of rain that falls varies materially with the locality. In San José it is from 15 in. to 20 in., while in places not ten miles distant twice that amount is recorded. During this period there are from thirty to forty days on which



more or less rain falls; from fifty to seventy days that are cloudy; the rest bright and pleasant. These estimates will vary with particular seasons; but, taking the average of a series of years, it will be found that, from October to April, one-half of the days are cloudless, and fully three-fourths such that any out-door vocation can be carried on without discomfort or inconvenience. Cyclones and wind storms are wholly unknown, and thunder is only heard at rare intervals, and then as a low rumble forty miles away in the mountains. With the month of March the rains are practically over, though showers are expected and hoped for in April. Between May 1 and 10 a slight shower may not be unexpected, but it causes no particular damage or inconvenience. By the first of July the surface moisture is taken up and dissipated, and plant growth dependent on this ceases. The grasses have ripened their seed, and, self-cured and dried, are the nutritious food of cattle and sheep. The fields of grain are yellow and ripe, and wait but the reaper. Forest trees and shrubs have paused in their growth. This, to the vegetable world, is the season of rest. This is the winter of the Santa Clara Valley—winter, but strangely unlike winter elsewhere, for here man has interposed. Here, by art and by labour, he has reversed the processes of Nature and constrained the courses of the seasons. In gardens bright with foliage and resplendent with flowers there is spring in its freshness and beauty, while, in orchards teeming with fruits, and in vineyards purple with ripening grapes, summer and autumn vie for supremacy. And so, with changing beauty and ceaseless fruition, pass the seasons of this favoured clime."

Concerning the topography of Santa Clara County, it may be said that, while lying in about the same latitude as Italy and Southern France, it has a climate all its own, and advantages possessed by no other country. The valley was originally a lake or river bed. As one has well written, "When the waters receded they left a sedimentary deposit more fertile than that of the valley of the Nile. To this deposit the succeeding centuries have added the rich washings of the hills, combining such mineral elements as are most conducive to plant growth and production. The ancient lake-bed has been transformed into a fertile plain that now produces a larger income than any other territory of equal area on the face of the globe."

OUR CLIMATE.

Of our climate a book could be written. It is peculiar to itself, and we do not understand it. More noticeable in the spring-time than at any other period of the year, winds which rise about noon every day rush through the Golden Gate, are deflected against the mountains to the east, and produce the delicious breezes of our summer days. Being sheltered by mountains from the ocean, harsh winds occur but at the rarest intervals; fogs are practically unknown; there are no sudden changes of heat and cold; blizzards, cyclones, and tornadoes are only read of elsewhere; severe thunderstorms are never experienced; and the valley may be declared exempt from all disagreeable climatic visitations, with the exception of an earthquake shock occasionally, but that not of a serious nature. During the very few days in summer when the thermometer runs the highest, the heat is rarely if ever oppressive, and sunstrokes are unknown.

Our nights are delightfully cool and pleasant. During the winter months, while an occasional frost appears, and at rare intervals a little ice is seen, snow is of such rare occurrence in the valley that it becomes gleeful, and it is said to have occurred but three times in twenty-five years, disappearing almost as rapidly as it fell. This kind of weather, like the warm periods of summer, lasts but a few days. Noonday is nearly always warm and pleasant.

In what we are pleased to call our "foothills," also known as our "warm belt," the most delicate flowers bloom in the open air throughout the year, and orange and lemon trees can be seen laden with fruit in January. Thus do we enjoy a climate that is unsurpassed, one that for health is unequalled, and where the highest development of all the products of our soil is brought about.

The following table gives the temperature at San José (San Hosay), which is the county town of the Santa Clara County, for the years 1892 to 1895 inclusive:—

Month	1892			1893			1894			1895		
	Highest temp.	Lowest temp.	No. days above 85°	Highest temp.	Lowest temp.	No. days above 85°	Highest temp.	Lowest temp.	No. days above 85°	Highest temp.	Lowest temp.	No. days above 85°
January . . .	65	37	—	65	35	—	64	28	—	62	32	—
February . . .	67	35	—	67	36	—	65	32	—	69	37	—
March . . .	76	42	—	78	38	—	74	35	—	71	36	—
April . . .	74	42	—	74	44	—	82	42	—	78	43	—
May . . .	95	47	5	85	45	—	86	45	1	87	46	2
June . . .	90	52	1	94	51	2	88	50	1	96	50	5
July . . .	100	53	2	89	48	3	91	53	8	94	54	3
August . . .	96	54	5	85	52	—	101	55	4	92	53	4
September . .	87	50	1	79	45	—	97	50	7	92	50	3
October . . .	85	42	—	81	41	—	88	44	1	86	48	1
November . . .	78	37	—	77	37	—	76	40	—	84	34	—
December . . .	72	34	—	78	30	—	61	34	—	70	30	—

The above table shows the highest and lowest temperature, the hours of observation being 7 A.M. and 2 P.M. of each day in the month.

OUR SOIL.

The soil of Santa Clara County varies greatly in different localities, some parts being specially adapted to the cereals, others to vegetables, and still others to orchard fruits, small fruits, and the vine. Many fields are continuously planted with one kind of grain, and yield heavily. Wheat raised in the eastern portion, where the soil is somewhat gravelly, sells for the highest price and makes the best flour. Occasionally a stretch of "adobe" soil is found, its adhesive qualities making it difficult to cultivate in wet weather, yet producing exceedingly heavy crops, and considered very valuable land.

The district towards the Bay is given over more to grazing and small fruits. Running north-east to south-west, and directly through St. José, is probably the most fertile section of the valley. The rich bottom land adjoining the Los Gatos Creek, and locally known as "The Willows," is the heaviest fruit-producing section in the world, and every kind of fruit appears to grow with equal luxuriance. And while our foot-hills are declared the native home of the grape, owing to the soil being of a dark brown sandy loam, quite unlike that of the valley, richer flavoured, more luscious fruit than is grown thereon, even to an altitude of 2,000 or 3,000 feet, is not grown anywhere. Finally it may be

said, that although many varieties of soil exist in our county, no theory of specialisation is safe from disapproval, for anything will grow anywhere, scores of orchards being planted with one or two kinds of fruit for the market, while for home use a dozen or twenty kinds of fruit and berries are grown on the same land. As to the depth of our soil, it is not considered; cultivation never reaches the bottom.

WHAT WE GROW.

What do we not grow? What is there raised on the habitable globe—from fancy trotting stock to Durhams or Holsteins, from Southdowns to Berkshires, from Plymouth rocks to bronze turkeys, from wheat, rye, barley, alfalfa, corn, tobacco, cotton, or Rochester onion seed, along the whole category of fruits and vines to almond, fig, and olive orchards, and from edibles to drinkables from mammoth squash to giant beets—that this glorious Santa Clara County does not produce? Is it almonds, or English walnuts, or figs, or other semi-tropical fruits? Would you like some of our “Quito” olive-oil? Permit us to drive you nine miles distant, to an eighty-acre orchard where it is grown and made. Oranges for breakfast? All right. Take your tickets for Los Gatos, “the town that nestles in the hills,” ten miles away. Please tell us what we do not grow here! Enumeration seems to us to be superfluous, because it would be almost impossible to enumerate everything in one brief paper.

OUR RAINFALL.

As already mentioned, the rainfall of Santa Clara County is all but exclusively confined to the months of October to March inclusive. An occasional shower in April, May, and even as late as the first few days of June does occur, but at rare intervals. From the following table, officially prepared for the Board of Trade of San José, it will be seen that the average rainfall for the past four years (which may be taken as a fair index of all preceding years) is 17.42 inches.

Month	1891-92			1892-93			1893-94			1894-95		
	No. of inches rain	No. of clear days	No. of cloudy days	No. of inches rain	No. of clear days	No. of cloudy days	No. of inches rain	No. of clear days	No. of cloudy days	No. of inches rain	No. of clear days	No. of cloudy days
July	—	29	2	—	31	—	—	31	—	6.28	8	17
Aug.	—	31	—	—	31	—	—	31	—	1.42	15	5
Sep.	.37	27	3	—	30	—	—	30	—	1.46	14	8
Oct.	.08	28	3	1.00	28	3	—	29	2	2.05	18	7
Nov.	.46	27	3	4.00	23	7	.81	20	10	1.36	19	3
Dec.	5.84	19	12	7.77	21	10	1.69	22	9	—	29	—
Jan.	1.11	25	6	2.95	23	8	4.73	21	10	—	27	1
Feb.	1.60	21	8	2.68	23	5	2.61	16	12	—	28	—
Mar.	4.75	22	9	5.12	21	10	.69	27	4	.05	25	2
April	.65	25	5	1.35	23	7	.63	25	5	.83	20	5
May	1.20	26	5	.30	28	3	1.36	25	6	1.08	22	5
June	.05	27	3	—	30	—	.40	28	2	.84	17	7
Totl.	16.11	307	59	25.27	312	53	12.92	305	60	15.37	242	60

DESTINATION.

Our fruit goes in three different channels.

1. A large quantity goes to fruit driers, where it is dried, and then shipped to the Eastern States and to Europe.

2. A large proportion is canned ; it is sent to canneries, where it is prepared, canned, and shipped the same as dried fruit.

3. The rest is shipped green to San Francisco and other large cities and towns.

Grapes are made into wine, jelly, and also shipped with other fresh fruit for immediate eating. There is also one place where evaporated grape juice of medicinal and nutritive worth is made.

ALVISO.

Around Alviso, which is a port in the north of the county, the soil is very fertile. It is a heavy black loam, formed of silt brought down from the mountains by the Guadalupe river and Coyote Creek, and peat formed by the decomposition of vegetable matter. This makes one of the richest combinations possible, and seems inexhaustible. It is one of the best in the world for vegetables, berries, and small fruits ; and it is safe to say that in the years to come the Alviso district will be one of the most noted.

berry-growing districts in the United States, as the rich soil, cheap freights, and artesian water plainly indicate.

The perishable nature of berries gives Alviso a great advantage over more distant points. More than one-half of the strawberries consumed in San Francisco are grown in the vicinity of Alviso. The varieties usually grown are the Longworth and the Sharpless. The price received varies from 10s. to 24s. per chest, and the profit from £15 to £100 per acre.

Apples do not acquire the flavour nor possess the keeping qualities which characterise those grown in the mountains; but they attain a greater size, and as the market is near they are grown very profitably. The crops are larger than are usually obtained elsewhere. A good grower secures from 500 to 1,300 boxes per acre, and receives from 2s. to 4s. per box.

Pears thrive also in an unusual manner, and are generally profitable. They seem to assimilate any unusual amount of moisture in the soil to better advantage than most other fruit trees.

The price of Pears varies more than the price of some other fruits, however, and for this reason they are not always so highly profitable. A well-kept Bartlett pear orchard, however, is generally remunerative. This low land is the very best for Asparagus, and more than two-thirds of the amount consumed in San Francisco is grown at Alviso. The crop varies from 75 to 125 50 lb. boxes per acre. The price ranges from 3s. to 12s. a box, and the gross income is from £5. 10s. to £45 per acre.

Tomatos are almost twice as profitable here as in the Eastern States, as the season is twice as long, the fruit is twice as large, and the output per acre more than twice as great.

Raspberries and Blackberries are grown extensively, as they are at home in the silty, peaty soil of the low lands, and bear prodigious crops. Raspberries usually sell from £1 to £1. 12s. per chest of 100 lb. The income ranges from £35 to £100 per acre.

Alfalfa, grain, and nearly all fruits and vegetables grow thriftily. Alfalfa cannot be grown profitably except in places where it can be irrigated. In this county its culture is confined almost exclusively to the artesian districts. It is cut six times a year. If it is cut less frequently the stalks grow too rank.

The price per ton is about £9. 10s., though it is occasionally as much as £10.

Sugar beets are now being grown to some extent, as the refinery at Alvarado is but fourteen miles distant. The price per ton ranges from 22s. to 25s., and the product per acre from twenty to forty tons.

The following table shows the relative value of the different grades of dried prunes, reckoned with reference to quotations applicable to the four sizes. By "four sizes" is meant four grades of prunes, namely:—

(1)	Those requiring between	60 to	70	prunes to weigh a lb.
(2)	"	"	70 "	80 "
(3)	"	"	80 "	90 "
(4)	"	"	90 "	100 "

The term "four sizes" used commercially means equal quantities of those grades; that is, a twelve-ton car load of the four sizes contains three tons of each of the four grades.

The different grades, of course, have different values, which are computed with reference to the basis price for the four sizes universally used as the sizes upon which to base values. The relative value of the various grades when prices are quoted for the "four sizes" may be seen at a glance by consulting the following table, which was prepared by F. M. Righter, Esq., the President of the Campbell Fruit-Growers' Union:—

BASIS PRICE FOR THE FOUR SIZES.

Sizes of Prunes, that is number required to make 1 lb.	3	3½	3¾	4	4½	4¾	5	5½	5¾	6	6½	6¾	7	7½	7¾	8	cents (½d.)
30 to 40	5½	5¼	5¼	6	6½	6¼	7	7½	7¼	8	8½	8¼	9	9½	9¼	10	10½
40 " 50	4½	4¼	4¼	5	5½	5¼	6	6½	6¼	7	7½	7¼	8	8½	8¼	9	9½
50 " 60	4¼	4¼	4¼	5	5½	5¼	6	6½	6¼	7	7½	7¼	8	8½	8¼	9	9½
60 " 70	3¾	3¾	3¾	4	4½	4¼	5	5½	5¼	6	6½	6¼	7	7½	7¼	8	8½
70 " 80	3¾	3¾	3¾	4	4½	4¼	5	5½	5¼	6	6½	6¼	7	7½	7¼	8	8½
80 " 90	2¾	2¾	2¾	3	3½	3¼	4	4½	4¼	5	5½	5¼	6	6½	6¼	7	7½
90 " 100	2¾	2¾	2¾	3	3½	3¼	4	4½	4¼	5	5½	5¼	6	6½	6¼	7	7½
100 " 110	1¾	1¾	1¾	2	2½	2¼	3	3½	3¼	4	4½	4¼	5	5½	5¼	6	6½
110 " 120	1¾	1¾	1¾	2	2½	2¼	3	3½	3¼	4	4½	4¼	5	5½	5¼	6	6½

This is made out in American money, but a cent is worth $\frac{1}{2}$ d. of English money.

LABOUR MARKET.

In Santa Clara County, for general farm work, the average wages are 4s. a day and board, or 6s. a day without board. A few pay more and some pay less. When fruit is picked by the day 6s. is usually paid without board.

The average contract price for gathering prunes is 9s. a ton. When Grapes are picked by contract 4s. a ton is usually paid, though the Chinese and Japanese take contracts to pick as low as 3s. 9d., 3s. 4d., and even 3s. per ton. These men are a curse to California, and any other place where there are many of them. A man can pick from a ton to a ton and a half a day. Men working at fruit driers, engaged in carrying trays and handling fruit, receive from 5s. to 6s. per day without board.

SHIPPING GREEN FRUIT EAST.

Whether it pays best to dry fruit or ship it green depends upon the quality and variety of the fruit. The quality, in turn, depends upon the soil in which the fruit is grown, and the climatic conditions by which it is surrounded. As a rule, fruit grown in the mountains has better keeping qualities than that which is grown in the valleys. The quality of fruit, however, depends upon so many things that it is not possible to deal definitely with altitude.

Shippers claim that cherries produced in the Santa Clara Valley keep better than those from any other part of the State. This claim, however, may have to be modified when cherries are more extensively grown in our mountain districts.

Our cherries are now shipped in refrigerator cars to New York, Boston, Chicago, and nearly all the principal cities in the East. Santa Clara County is also noted for its autumn and winter pears. There are other districts which send out Bartlett pears equally good, both as to flavour and keeping qualities with those raised here; but their autumn and winter pears are not in such demand as ours. Shippers often send them to the East in ventilated cars, and on arrival they are placed in cold storage, where they keep through the winter till as late as March and April. Thus they are in market at a time when the season for other fruits has closed, and as a result bring high prices. Good table grapes are also shipped East profitably in refrigerators.

The varieties that are the most satisfactory for this purpose here are the Verdel, Muscat, and Cornichon, and, as a rule, those exhibiting the best keeping qualities come from that portion of the county known as the Santa Cruz mountain district. Some of the Cornichons grown in the valley keep well enough for Eastern shipment, and all of the best varieties of table grapes may be profitably grown for the San Francisco market. As a rule, the fruits that may be most profitably shipped East, green, are cherries, grapes, plums, and pears. The profits realised, of course, depend upon the quality of the fruit, the condition of the market, and the care exercised in properly supplying the demand. If the grower deals with some well-known agent, he gets all that the fruit will bring in the Eastern market, after the freight is paid, less 7 or 8 per cent. commission. Freight rates on green fruit from San José to Eastern cities are usually quoted per car load. With a view of securing greater detail the rate here is given per box. Cherries are always shipped in 10-lb. boxes; pears in 40-lb. boxes; and plums, peaches, and grapes in 20-lb. boxes. From San José to Kansas City or Omaha the freight charges are: for cherries, per 10-lb. box, $9\frac{1}{2}d.$; pears, per 40-lb. box, $3s. 6\frac{1}{2}d.$; plums and grapes, per 20-lb. box, $1s. 8\frac{1}{4}d.$; peaches, per 20-lb. box, $1s. 4\frac{1}{2}d.$ From San José to Chicago, St. Paul, or Minneapolis: Cherries, per box, $9\frac{1}{2}d.$; pears, per box, $3s. 6d.$; plums and grapes, per box, $1s. 9d.$; peaches, per box, $1s. 4\frac{1}{2}d.$ From San José to St. Louis: Cherries, $9\frac{1}{4}d.$; pears, $3s. 7d.$; plums and grapes, $1s. 9\frac{1}{2}d.$; peaches, $1s. 5\frac{1}{2}d.$ From San José to New York or Philadelphia: Cherries, $1s.$; pears, $4s. 3\frac{1}{2}d.$; plums and grapes, $2s. 2\frac{1}{2}d.$; peaches, $1s. 9d.$

At present the most successful and satisfactory method of shipping green fruit to great distances is in refrigerators. The price of freight will not be higher, and will probably be lower within the next few years. The freight to San Francisco is low. It sometimes pays better, however, to ship East.

MONTHS, SEASONS, AND WHAT THEY BRING.

In most countries the year is divided into four seasons, the lines between which are so definitely defined, that not only may spring, summer, autumn, and winter be distinguished, but may be outlined by months in the almanack. In California the

seasons merge into one another so gently, and the line between them is so dimly defined, that it can only be designated as existing between two dates some distance apart. In this State the year is generally divided into what are termed the wet and dry seasons, but this does not properly designate nor appropriately define them. Summer lingers so long in the lap of winter that set calculations cannot be relied upon.

In September come the first perceptible indications of approaching change from the bright, warm, sunshiny days of summer. The nights become the least bit cooler. From a mean temperature of 60 deg. shown in August, the thermometer drops to 58 deg. on an average in September; ranging from 60 deg. to 70 deg. in the daytime. About the only fruit that makes its first appearance in September is the pomegranate. The bulk of the fruit crop has been gathered, though some yet hangs on the trees. Almonds are almost ripe, and grapes are ready to be picked. All kinds of vegetables are yet in the market, and flowers bloom as usual. Farmers who have grown careless because of the long drawn-out summer afternoons have hay uncovered in the field, or perhaps a stack of wheat yet waiting to be threshed. The days are a shade cooler towards the end of the month, with just a suggestion of haziness. A shower at this time would be very unusual.

In October come more prominent signs of change. Yet they are signs which would be almost imperceptible to one not acquainted with the peculiarities of our climate. The air grows hazy and seems oppressive. Smoke rises slowly and hangs over the valley or along the mountain slopes. The winds are no longer constant from any quarter, but become variable, both as to direction and force. Perhaps they cease. Perhaps sudden blasts send leaves fluttering down from the trees or whirl the dust along the road. The days are cooler, and the peculiarly dry feeling which characterises the air in summer is replaced by one of dampness. Dark lead-coloured clouds drift across the valley and clouds may hang over the mountain tops, but it does not rain. It is just getting ready. No one is justified in purchasing an umbrella in the Santa Clara Valley upon the mere suggestion of a rain cloud. The first clouds that come are evanescent. They go floating lazily over the valley, and their shadows play hide and seek on hill and dale—but still it does not rain. Then some day the air

feels chilly and the sky is dark. There is a distant roar in the cañon and a white mist in the air. The atmosphere grows darker, and a few scattering drops are heard on the roof, and then comes a soft, gentle shower. No snow with it, of course, no sleet, no wild winds; just a nice warm rain. It may rain until three o'clock in the morning, when it usually ceases until just before daylight, when another shower may be expected. The clouds then commence to clear away, and by ten o'clock the sun is shining, and Nature looks cheerful and refreshed. In the early part of October rain may fall every few days until an inch or more has fallen. Then there will probably be a week or more when the weather will be clear. The sky is of a brighter blue, and the hills have grown darker. If more rain falls the sunny slopes commence to lose their sober russet and take on a vernal hue. Mushrooms break through the sod, and a few wild flowers push up their tiny leaves.

In November rain usually falls more frequently, and the rainy season is generally established by the latter part of the month. It occasionally happens that it commences late, and but little rain falls previous to the 1st of December. If the season is an average one, about 3.89 in. of rain will have fallen by the end of November. In the meantime the farmer has been ploughing the mellow earth and sowing the golden grain. The orchardist commences to prune his trees, and if the season is an early one, the vineyardist his vines. Rain may fall during a period of two or three days at a time, but there are usually during this month a great many sunshiny days, though they may be ushered in with a slight fog or a darkened sky. Farmers may work in the sunshine during the greater part of the month, and are seldom inconvenienced by any severe or long-continued rain-storms. Blackberries, raspberries, and a few strawberries are still in the market, and all kinds of vegetables. A few light frosts have occurred along the creek-bottoms and in the lowlands. No snow has fallen, even upon Mount Hamilton, the tallest peak in the county, and upon its crest, 4,250 ft. above the sea, the Lick Observatory's white dome yet frequently reflects the western sun. The rainy season, however, is now fully established. Along in December, however, a little snow will fall on the mountain tops, and the air will be decidedly crisp. If in the night the wind dies down

mountain slopes, and frost will settle in the valley. In the lower and most exposed districts delicate flowers will be injured. Many plants that grow by the house or in other protected places will flourish and bloom all the winter. Along the foot-hills, at an elevation of from 400 to 1,800 ft., frosts will be very light or altogether absent. In the warmer foothill belts, oranges and lemons grow, and ripen throughout the winter. In the valley sunshine and shadow have been alternating. More rain falls here in December than in any other month, and yet there is considerable sunshine. There are about 300 sunshiny days in the year. Hail falls occasionally, but no snow, unless it be a few stray flakes, and they usually melt before the ground is white. No snow has been seen in the towns along the foot of the Santa Cruz Mountains for at least eighteen years. The thermometer has ranged between 34 and 58 deg. above zero except on nights when frost occurred. It seldom registers less than 30 deg. above zero, and the lowest temperature we find recorded for the past decade is 22 deg. above zero.

In January the rainfall will not be as great as it was in December, and the wind will be less vigorous. Yet nothing can be said which will certainly indicate days on which rain will or will not fall. In January, too, the wind is more capricious. During more than half the year the wind is quite methodical, and compared with those which visit other States, very gentle at all times. On the mountain tops a breeze blows quite steadily from the north-west in the day-time, summer and winter, increasing in force, of course, during the latter season. In the valley, however, wind-currents are influenced by the local topographical conditions, and are mild or strong without regard to the conditions prevailing upon the mountain tops. Ploughing and sowing continue, trees are being planted, and orchardists are still pruning. Grass is growing rapidly, and vegetables are coming in. Onions, lettuce, carrots, beet, cabbage, turnips, and radishes we have with us always. In this month, however, new potatoes and green peas are first seen in the market. The mean temperature of the month is 43·3 deg., with 30 deg. and 56·5 deg. as extremes. Once during the past ten years the thermometer fell to 25 deg., above zero, of course. The temperature never reaches zero in the Santa Clara Valley.

in January. The rainfall during this month seldom equals 2 in. The weather grows a little warmer, the mean temperature rising to 48.2 deg., with 35.5 deg. and 60.8 deg. as the extremes. A few orchardists still prune, but the work should end with the month, preferably sooner. There are usually a number of warm, sunshiny days, and these cause a few almond trees to blossom.

March is still warmer, and almonds, peaches, plums, and cherries bloom profusely. The mean temperature is 52.3 deg., and the extremes 40.7 deg. and 63.9 deg. In this month the winds are variable, and more rain falls than in any month except December. The average rainfall for March is 3.77, but the rain is warm, and trees, vines, and vegetables grow with increased and remarkable vigour.

When April comes every orchard is a sea of flowers, and the air is full of perfume. Wild flowers tint the hillsides, birds fill the air with melody, and gentle breezes go laughing o'er the wheat. The average rainfall for the month is 1.85 in., and the mean temperature 50.1 deg. The thermometer has indicated as low as 37.4 deg., and as high as 64.8 deg. in April. As April passes away spring is preparing to leave and summer is approaching. Strawberries are here, and will be seen in the markets until the latter part of November. Cherries, red and ripe, hang thick upon the trees, and every field is brilliant with wild flowers.

In May there is usually very little rain. The average for this month is .53 of an inch. Haying commences in this month, and as a rule there is very little danger of injury from rain. The average daily temperature is 57.9 deg., the lowest being 42.2 deg., and the highest 73.6 deg.

June is one of the warmest months in the year, the average daily temperature being 58.7 deg., with a mean minimum of 41.4 deg., and a mean maximum of 76 deg. During this month the thermometer upon rare occasions registers 85, 90, or 95 deg. The highest figure reached during the past ten years was 104 deg. Apricots now come into the market. A few ripen in May, but now they are plentiful. The earlier varieties of peaches are ripe, and prunes are ripening; raspberries and currants are ripe, and it is the height of the cherry season. Strawberries and all kinds of vegetables

uninterruptedly during this month, and there is never any rain. Haying is about completed, and grain is ripe.

July is the hottest month of the year; the mean daily temperature being 63·3 deg., the lowest mean 45·6 deg., and the highest mean 81 deg. The temperature may upon occasion reach 90, 95, or 100 deg., the latter figures being unusual. No rain falls in July, none in August, and very little, if any, in September. The horticultural advantages we possess are due, in a great measure, to this fact. Summer rains would injure our fruits, berries, grapes, hay, and grain, and greatly interfere with the harvesting, curing, and packing processes. Melons are coming in, and apples, pears, and figs are ripening. Some varieties of grapes are ripe, such as the Sweet-waters.

With the ushering in of August the heat of summer is gradually superseded by the coolness of autumn. So slowly does the change come that the mean daily temperature of August is but 3·2 deg. less than that of July. In this month the minimum temperature is 46·9 deg., and the maximum 79·30 deg. Nearly all kinds of fruits are being harvested. Water-melons and musk-melons are plentiful, and nectarines are getting ripe. Full forces are at work in canneries and driers. Then August merges into September; the latter month bringing weather so similar that the thermometer indicates a difference of less than 2 deg. in the mean temperature. Thus summer shades off into autumn, and another round is commenced. The seasons are separated by very fine lines, and it is difficult indeed to tell when a Santa Clara County winter ends and spring begins, or when spring ends and summer commences.

It may be said that the elements are always gentle and the climate kind. In this valley it is a year without snow, without tornadoes, without blizzards, and with equable temperature, much sunshine, and long-continued fruitage.

The figures quoted relating to rainfall apply more particularly to San José, where the average annual fall is 19·85 in. In most other districts of the county the rainfall is greater, the figures ranging from 30 in. in the northern portion of the valley, to 40 in., and even to 65 in. in some of the mountain districts. The heaviest rainfall occurs along the summits of the Santa Cruz Mountains. The temperature is a little lower on the mountain
~~and dare~~ but still it does not rain. ~~Then some sunshine than~~ currents of the air are

Always mild and exceedingly equable, the climate of the Santa Clara County makes it the home of the olive, the orange, the vine, and the fig; the land of sunshine, fruit, and flowers.

The price of land in the Santa Clara County varies considerably, as it is influenced by numerous local conditions. Land within a radius of three miles from San José suitable for fruit growing commands from £40 to £120 an acre, unimproved. Similar land from three to ten miles from that city may be had for from £30 to £60 an acre. Valley land still further from the city for from £15 to £30 an acre.

It might here be well to give a few statistics of irrigation. There are in an acre 6,272,640 square inches. A stream 1 in. wide and 1 in. deep, flowing at the rate of four miles an hour, will give 6,082,560 in. in twenty-four hours. Such a stream will therefore cover an acre of ground with water nearly 1 in. deep in twenty-four hours. This equals about 25,920 gallons. At Riverside, California, orchardists as a rule use an inch of water to three acres; some an inch to five acres. The duty of water in Southern California as a whole, may be put at an inch to eight acres, and the cost of water, first charge, £7 to £12 for the right, and a further charge of 6s. to 10s. an acre per annum for general expenses. The duty of water in Santa Clara County is much greater, owing to the character of the soil. There is at present no extensive system of irrigation in operation here. One, however, is now being constructed. In the use of water for irrigation it may be estimated that 1,000 gallons of water a minute will irrigate an acre an hour of row crops, such as potatoes, corn, &c., and it generally requires two men to handle this amount of water properly. An inch of water nominally will cover an acre of land. Upon the necessity for irrigation in this county there is a wide difference of opinion.

In closing the first part of this brief sketch, I might say:

“ 'Tis pleasant through the loopholes of retreat,
To peep at such a world as this.”

Francisco, where there is a ready market for early fruits, and at all times for vegetables and berries. The advantage we have in gathering and handling fruit is also important. The rainless summers and great percentage of dewless nights enable us to dry fruit in the open air without protection day or night until late in the season. The fruit does not mould, because the peculiar dryness of the atmosphere is not favourable to fungoid growths.

The Santa Clara Valley is one of the most extensive districts in the State which is, as a whole, suited to the growth of some valuable product. Nearly every acre in the valley, and the greater portion of the mountain land, is suited to fruit trees, vines, or vegetables. Different localities are suited to different fruits, as there is a variety of soil and climate, the latter being influenced by elevation and topography.

The largest fruit canneries in the world are in operation in the vicinity of San José, and extensive fruit-drying establishments are located in every district. This is a feature of great value to the orchardist, as a great deal depends upon the facilities for preparing fruit for market.

Prune growing is here the most extensive, and usually the most profitable fruit industry. The Prune grows well in nearly any portion of the valley, though it thrives best in soil that is not too heavy. It is easily cultivated and readily handled. As the fruit is dried, it does not have to be marketed immediately, and does not come under the head of "perishable." The trees are as a rule planted 20 feet apart, which means 108 trees to the acre. They commence bearing the fourth year, and sometimes in the third, and are in full bearing in the seventh. The yield will average 100 lbs. to the tree, and the fresh fruit fetches from $\frac{1}{2}d.$ to $\frac{3}{4}d.$ a lb. The gross income, therefore, ranges usually from £20 to £40 an acre. Orchards in full bearing occasionally yield from £40 to £60 an acre.

Next in importance, both as to acreage and profit, is the Apricot. The culture of this favourite fruit is limited exclusively to the Pacific coast, and only reaches perfection in California. This is one instance in which the climate of California does a perfect work; for while the Apricot will grow elsewhere, it does not thrive; and while it grows in nearly every section of the State, there is but one district which can compete with the

Santa Clara Valley. Apricots grow best in the sedimentary soils. In this valley they commence to bear the third year, and the fourth year the crop pays a little more than the expenses. Thereafter the crops are usually large. This fruit is always in demand, and the demand is increasing as the delicious flavour of the fruit is becoming better known. Either dried or canned, it is beyond comparison as a table fruit. It is dried in the sun, and when dried brings from 2½*d.* to 6*d.* a pound. The fourth year from planting an orchard will generally produce five tons per acre, and the fresh fruit sells for from £3 to £6 a ton. The average price last year was five-eighths of a penny per lb., or £5 a ton. This year the price was £6 per ton, the income ranging from £15 to £70 an acre.

Peaches may be grown in nearly every State in the Union, but they prefer a warm climate, and only reach perfection in California. All the favourite varieties of this delicious fruit ripen here in the full perfection of sweetness and flavour, but the Early Crawford is the prime favourite. Three years after planting the trees yield a good crop, and thereafter the crop is usually so heavy that props must be used to keep the trees from breaking down. Generally the fruit must be thinned, and it pays to do this, as then it is larger and has a better flavour. Peaches thrive better in the lighter and warmer soils. They are as a rule nearly as profitable as Apricots, and occasionally net even more. The earliest ripen in May, and find a ready sale at high figures. One variety succeeds another throughout the summer, and Peaches may be had as late as November. The returns are between £15 and £60 an acre.

Californian Cherries, like all other products of the State, are remarkable for their size, flavour, and beauty of appearance. The Cherry tree likes a rich, arable, silty soil. Cherries do not come into bearing before the seventh year, but after that will yield largely, and choice Cherries always command a good price. The first ripe Cherries appear in May, and the later varieties in June, July, and August. The principal varieties cultivated here are the Royal Anne, Napoleon, Bigarreau, and Black Tartarian. The price ranges from 3*d.* to 10*d.* a lb., with the average about 4*d.* a lb. The yield per acre ranges from £40 to £200, and the average is about £60 gross.

The Pear adapts itself to a diversity of soil and climate more

readily than any other tree-fruit grown. Yet the Bartlett, which is one of the choicest varieties known, only reaches perfection in certain districts. It requires a deep, moist, and rich soil with a warm climate. There are several varieties grown here, each presenting some quality which makes it desirable. The Pear here commences to bear the third year, but is not in full bearing until the seventh. The choicest Pear-growing districts are the silty lands along the watercourses, and where water can be had for irrigation. Only the best varieties, with the most favourable surroundings, produce the largest crops; but with the best conditions Pears produce crops worth from £20 to £200 an acre, depending upon the market and on the variety grown. The price per ton varies. This year Pears were in great demand at £6 per ton. The chief varieties grown here are Bartlett, Comice, Vicar of Wakefield,* Glou Moreceau, Winter Nelis, and Easter Beurré.

Olive growing is one of the most profitable industries, but the greatest returns are secured by manufacturing the Olives into Olive oil, and that requires improved machinery and technical knowledge. The trees do not bear heavily until several years of age. They are long-lived, however, and will in the future be more extensively grown. The price of pure oil is now 36s. a gallon, and the gross income per acre ranges from £15 to £200, according to variety and age of trees.

Grapes may be grown in nearly any part of the county. Table Grapes like a heavy loam, while other varieties acquire a better flavour on the red gravelly and chalky soil of the foothills. Ordinary varieties are not very profitable, as the area in which they may be grown in California is so extensive. The shipment of choice table Grapes in refrigerator cars to the East is profitable, but fruit trees bring greater returns.

Strawberries here yield prolifically, especially along the bay and in the artesian district, which is one of the choicest Strawberry-growing lands in the United States. The yield is usually from £40 to £150 an acre gross.

Blackberries yield well also, and thrive over an extended area. In the artesian basin, north and north-west of San José, however, they bear through a more extended period, and return larger crops than in any other locality. The profits do not

* So called in America; in England, Vicar of Winkfield.

average as much as from Strawberries, but range from £30 to £100 an acre gross.

Raspberries are more easily gathered than Blackberries, and command a higher price, as the area of greatest production is not so extensive. They return from £40 to £100 an acre gross.

Oranges thrive in the foot-hills at elevations ranging from 600 to 1,800 feet. They are gross feeders, and require a rich, fertile soil containing plenty of moisture. The red lands of the foot-hills give good, perhaps the best, results. The oranges grown here are large, sweet, and free from scale. They only reach perfection in localities most free from frost, cold winds, and sudden changes of temperature. The choicest variety is the Washington Navel, which ripens here nearly a month earlier than in the choicest Orange-growing districts in the South, and early fruit commands fancy prices. Profits range from £35 to £75 an acre.

Apples grown in the valley reach a very large size, especially in the silty soils along the Los Gatos creek, Coyote, and Guadalupe. They lack the flavour and keeping qualities, however, which characterise the Apples grown in the mountains, and are not usually as profitable as the stone fruits, though they have been grown very profitably near Alviso.

There are various other fruits and berries which are grown to some extent, usually for private home consumption, though occasionally for profit. Of these Quinces, Plums, Figs, Crab-apples, Almonds, Walnuts, Currants, and Gooseberries may be mentioned. Almost anything that will grow anywhere in the temperate or semi-tropical zones will grow here, and many trees and plants only here reach their highest development. We have treated of those which are the most profitable.

FROM GROWING TO CONSUMING.

The main feature of the fruit-growing industry in Santa Clara County may be outlined as follows.

In preparing the land for planting it is, when practicable, ploughed thoroughly and deeply in the fall of the year, and the surface left unharrowed and exposed to the desiccating influences of the air during the winter. This adds to the fertility of the

soil, or, more properly speaking, it makes the plant food more available.

In laying out an orchard it is desirable to have it symmetrical in order to economise the land and to provide for facility in further use and care. There are various methods of aligning trees, each method having its own peculiar advantages. The principal forms are the square, the quincunx, and the hexagonal. The first two are those most commonly used.

By the square method, if the trees are 20 ft. apart, 108 trees are planted to the acre. This is one of the best forms for an orchard. By the quincunx method the number of rows are doubled, and a tree planted in the centre of every square. At 20 ft. apart by this method 199 trees may be planted per acre.

The hexagonal system makes the trees equilateral, equally distant one from the other in every direction. Six trees form a hexagon and enclose a seventh. By this method at 20 ft. apart 126 trees are planted to the acre.

The distance at which trees are planted in orchard rows varies considerably, but the method usually followed in planting Peaches, Prunes, and Apricots is to allow a space of 20 ft. between trees, which gives 108 to the acre. The trees grow so luxuriantly here, however, that the limbs often intertwine and make cultivation difficult. In many of the orchards planted recently the trees are 25 ft. apart, and in some cases 30 ft.

The prices of nursery stock vary so much that it is difficult to quote. Trees of the several varieties have in some seasons commanded from 1s. 0½d. to 1s. 3d. each, while in others they fell to 4d. and 4½d. The general average price of good trees during the past ten years has been from 6d. to 7½d., new and choice varieties ruling a little higher. Last year good Prune trees on Myroblan stock could be had for 3½d., and on Peach stock 2¼d. to 2½d. Apricot trees were 7½d. and Peach trees 5d.

The cost of cultivation varies. Usually parties will take contracts to plough shallow for 8s. an acre, and deep for 12s. an acre.

The digging of holes and setting of the trees costs from 2½d. to 3½d., according to the soil. It is within range to have orchards planted with trees 20 ft. apart at the following figures :—

	£.	s.	d.
Ploughing and harrowing	0	12	0
108 trees at 3½d. each	1	11	0½
Staking, digging, planting	1	11	0½

Parties often take contracts to plough, harrow, and prune young orchards for from 30s. to 40s. an acre for the season. For hilly land which cannot be worked except at a disadvantage, as high as from £2 to £2. 8s. an acre is charged. When a cultivator is used the ground is usually worked from four to ten times in a season, according to the nature of the soil. Orchards are never seeded to grass here as they are in the East. This constant stirring of the soil adds greatly to its productive powers, probably by exposing the plant food to the action of the sun and air, and bringing about chemical changes which make it more easily assimilated by the tree. The cost of this cultivation is often noted by those who have grown fruit in the East, where this system is not followed. The work costs but 2s. an acre each time, however, or from 8s. to 14s. an acre each season, and the increased yield makes the work remunerative.

The cost of pruning varies according to the size and variety of the trees. Prune trees are not now pruned very much. They are, as a rule, merely thinned out to let the air and sunshine in, and allowed to grow with very little if any cutting back. Peach and Apricot trees, however, are cut back heavily in order to avoid the growth of too much wood and too great a weight of fruit. Notwithstanding the heavy pruning, Peaches are always thinned after the crop sets, and even then the branches must be often propped to prevent them from being broken by the weight of fruit.

The conditions vary so much that each orchard must be estimated for separately by those taking contracts to prune. Contracts range about as follows:—First year, Prunes, from 1s. to 1s. 4d. a hundred; second year, 1s. 8d. to 2s.; third year, 4s.; fourth year, 12s.; fifth year, £1. The price for older Prune trees ranges as high as 36s. a hundred.

Peaches and Apricots cost more after the second year, being a penny a tree for trees two years old, and 2½d. a tree for trees three years old, and after that about as many halfpennies per tree as the tree is years old up to ten or twelve years.

Fruit growing, although it is more profitable here than in any other State in the Union, is attended with difficulties as elsewhere, though perhaps in a lesser degree. We never have the severe weather here that prevails in the East; but even in the Santa Clara Valley, noted for the mildness of its climate,

and known as the "Garden of the World," our fruit crop is occasionally injured by frost. The greatest drawback, perhaps, is the scale and other insects which infest the fruit trees. These, however, may be kept in check by using proper sprays, as was mentioned in an article on "Insects and Fungi, with Remedies," published in the *Journal of the Royal Horticultural Society* for December 1897.

Pear and Apple trees are attacked by the codlin moth,* and the crop is materially injured unless sprays are used. Paris green is the spray generally used for codlin moth. An average of 1 lb. to 150 gallons of water is a good strength for general purposes. The poison is first made into a thin paste in a small quantity of water, and powdered or quick lime added, in amount equal to the poison used, in order to take up the free arsenic, and to remove or lessen the danger of scalding. The trees are usually sprayed four times, and the cost per acre averages about 6s. The brown scale has been almost annihilated by the Australian ladybird. The San José scale is also scarce.

Prune trees have seldom to be sprayed now. The average crop for Prune trees from seven to eight years of age is about 80 lbs. to the tree, though sometimes it runs from 100 lbs. to 125 lbs. If the tree is twelve years of age, from 125 lbs. to 200 lbs. may be secured. Six tons to the acre is a fair average. Prunes sell from £4 to £13 a ton. The average price last year was £6 a ton, and this season from £6 to £6. 2s. Apricot trees from seven to eight years old will average 100 lbs. per tree. The price last year was very low, ranging from £5 to £5. 10s. a ton. Peach trees from seven to eight years old will produce from 175 lbs. to 200 lbs. a tree. Early varieties a little less. The average price is about £5 a ton.

Fertilisers have as yet been but little used, but the results clearly indicate that artificial manuring pays if those elements are supplied in which the particular soil is deficient. Bone dust is good, but costs £6 a ton. Gypsum, from San Benito County, is now most largely used, as it furnishes necessary plant food, and can be had in carloads for £2 a ton. About 600 lbs. an acre is usually applied, but more or less according to requirements. Ordinary manure may generally be had for the carting,

* See the *Strand Magazine* for December, 1897, on "American Pests."

and some fertilise with it; but the greater proportion of our orchardists use no fertilisers of any kind.

The prices realised this season by our fruit growers have been very fair. Apricots have sold for from £5. 10s. to £7 a ton for those suitable for canning, and for drying purposes from £5 to £6 a ton. Peaches sold for from £4 to £6 for those suitable for canning, but lots for drying sold as low as £1. 12s. to £4 a ton. Prunes sold for from £5 to £6. 8s., the average price being £6 a ton. The Pear crop was light, and good Bartlett's sold the season through for £6 a ton. The minimum weight for a carload of fruit is 24,000 lbs. The freight rates on the Santa Fé and on the Southern Pacific Railroads are identical, one company always meeting any reduction made by the other. The rate on fresh fruit from San José to the London markets is 12s. per 100 lbs.

During the year Santa Clara County orchards and vineyards may be depended upon to yield as follows:—

January.—Oranges, Lemons, Strawberries, and occasionally Apples and Raspberries.

February.—Oranges, Lemons, Guavas, and Strawberries.

March.—Oranges, Lemons, Guavas, and Strawberries.

April.—Oranges, Lemons, Guavas, Strawberries, and Loquats.

May.—Currants, Loquats, Oranges, Lemons, Guavas, Strawberries, and occasionally Cherries, Apricots, and Peaches.

June.—Cherries, Plums, Apricots, Prunes, Peaches, Currants, Loquats, Oranges, Lemons, Guavas, Strawberries, Blackberries, and Raspberries.

July.—Figs, Apples, Grapes, Cherries, Nectarines, Plums, Prunes, Apricots, Peaches, Currants, and the others mentioned in June.

August.—Pomegranates, Quinces, with those in season in July, with the exception of Loquats.

September.—Same as August.

October.—Pomegranates, Figs, Quinces, Grapes, Apples, Plums, Prunes, Peaches, Lemons, Guavas, Strawberries, and Raspberries.

November.—Persimmons, Pomegranates, Quinces, Grapes, Apples, Figs, Plums, Prunes, Peaches, Oranges, Lemons, Guavas, Strawberries, and Raspberries.

December.—Same as November, with the exception of plums.

This list shows at once the great variety of fruits produced in the Santa Clara County, as well as the lengthy season during which they may be gathered fresh from tree and vine. They are all grown out of doors. Vegetables of most varieties are in the market all the year round.

COST OF DRYING.

Far away back in the horticultural history of the county it became evident that the financial success of the fruit-grower depended as much upon his ability to market his produce, as it did upon the selection of the varieties and of the locality in which they should be grown.

Fruit growers for years produced fruit and entrusted the sale of it to commission men, who were interested in securing their commission, rather than in widening the market or intelligently supplying its demands. As a result, the markets in some cities were often over-supplied, while perhaps those of larger cities were not supplied at all. In the case of fresh fruits, which were perishable, this often resulted in forced sales and a demoralisation of prices, while at the same time the same fruit would have been gladly received in other cities, where good prices could have been obtained.

Our fruit growers from time to time held meetings to discuss the situation and suggest remedies, and as a result of these meetings in 1891 the West Side Fruit Growers' Association was formed. Among the objects to be attained was the securing of more economical methods of fruit drying and more careful methods in the marketing of the product. Both were accomplished. This success led to the establishment in June 1892 of the Campbell Fruit Growers' Union.

The projectors made scientific experiments which resulted in the discovery of methods by which fruit could be more economically dried. A more uniform grading was also insured, with a corresponding increase in the price of the product. The expense of curing, packing, and marketing was also materially reduced.

The cost for drying a ton of fresh fruit, including all expenses from the time the fruit reaches the drier until it is put into the bins ready for sale, such as the cost of sulphur, lye, fuel, handling and grading, and the general expenses of operating the plant, such as the salary of the secretary, superintendent, book-keeper,

and night watchman, all office expenses, telephone, telegrams, interest on borrowed money used in handling the crop, and for making advances on fruit delivered, insurance, light, tax, depreciation of plant, and 7 per cent. interest on stock, is given by the Campbell Fruit Growers' Union as follows:—

	1892			1893			1894			1895		
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
Apricots	1	9	5	1	1	10	1	5	0	0	17	7½
French Prune . . .	0	8	9	0	8	6	0	9	0	—	—	—
Silver „	0	9	0	0	8	0	0	9	0	—	—	—
Egg Plums	0	9	0	0	8	0	0	8	0	—	—	—
Washington Plums .	—	—	—	1	16	11	—	—	—	—	—	—
Pears	—	—	—	1	1	4	—	—	—	—	—	—
Early Peaches . .	1	3	4	0	19	1½	1	5	0	—	—	—
Muir „	1	3	7½	0	19	1	not carried out.					
Cling „	1	5	5½	1	4	8	„	„	„	„	„	„
Salway „	1	7	10	1	0	10½	„	„	„	„	„	„

The best graders and dippers now in use are those manufactured by the firm of Messrs. Cunningham & Barngrover, of San José. Their machines have innumerable advantages over any others made, and are designed to meet the wants of large, as well as small, growers or packers. I cannot speak too highly of the material and workmanship employed in the manufacture of these indispensable articles, and the testimonials which have been presented to the makers are of the highest order. Sometimes the wet season is early, and Prunes are not all sun-dried; then it is that they have to be evaporated, and this costs about 24s. a ton.

I think that at this stage it would be well to give reports of interviews with ranchers, drying, canning, and packing companies around San José, the county town of Santa Clara County.

THE GREAT DUNNE RANCHO.

Choice fruit land in the Santa Clara Valley is cheaper at £40 an acre than the best corn land in the Middle States is at £10 an acre, because ten acres of land here in full bearing fruit trees will produce more than fifty acres of corn land in the East. It is not at all an uncommon thing for our orchardists to realise a net income of from £10 to £20 an acre. Yet there is land in the county which can be had for from £20 to £25 an acre, which

will grow fruit trees that will as certainly bring in £20 an acre when in full bearing, as other land in the county does. One of the last of the great Spanish grants in Santa Clara County was the great Catherine Dunne Ranch of 18,000 acres. This is now being sold in lots of 5, 10, 20, and 40 acres. Prices range from £5 to £25 an acre, quarter cash, and the balance in six equal payments, with interest at 7 per cent., the mortgagee to pay the tax.

BERNAL'S FRUIT AND VEGETABLES.

Ygnacio Bernal owns, on the Monterey road, about nine miles south-east of San José, 395 acres of land. The soil here is exceedingly fertile, as it consists largely of silt washed down from the surrounding hills. In this vicinity were located immense cattle and slaughtering pens, and the great pits where the refuse meat was thrown. Here hundreds of tons of bones have been mouldering for more than half a century, and bone dust is one of the richest fertilisers known. Here Ygnacio Bernal planted his orchard. He could scarcely have found a richer spot, and his trees show a most remarkable growth. The Peach trees are now three years old, are about 10 ft. high, and bore this year a large crop, considering their age. The Prune trees are much larger than ordinary trees of their age, and bore a few Prunes this year. Mr. Bernal utilises the space between the rows of trees by planting Corn, Peas, Beans, Melons, and Pumpkins. The Pumpkins produce on an average ten tons to the acre. The price received for them varies with the season. The lowest price is 6s. a ton in the field not cut, and the highest £1. The Peas raised are the Spanish Garvanzas, or Soup Peas. The produce ranges from ten to fifteen 100 lb. sacks to the acre. The price is generally low, but this year rose to £1 a cwt. The corn averages 2,000 lbs. an acre. Lowest price received 6s., and the highest 8s. a cwt. Musk Melons sell for from 12s. to 20s. a hundred. The usual crop of hay upon Mr. Bernal's valley land is two tons to the acre, and upon the hillside less. The price of Hay varies from 32s. to £5 a ton, the average being about £2. 8s.

MRS. J. H. SMITH'S SIX ACRES.

Mrs. Smith owns six acres on meridian 125°, about a mile from the Alameda, which is one of the most luxuriant and pro-

fitable spots in the county. The trees are well planted, have been well cared for, and even among the many magnificent orchards of the vicinity this one attracts attention and admiration by reason of the size and appearance of the trees and the crops borne. The orchard contains Cherries, Peaches, Apricots, and Apples.

THE WESTON PEAR ORCHARD.

A good illustration of the profits secured in Santa Clara County in Pear culture is furnished by Mr. B. F. Weston, whose orchard is about $2\frac{1}{2}$ miles north-west of Santa Clara, or $4\frac{1}{2}$ miles N.N.W. of San José. The crops and income for each year since the orchard came into Mr. Weston's possession have been as follows:—

In 1890 the trees bore a few scattered Pears, the entire crop only fetching £11.

Crop of 1891,	50 tons,	which sold for £9 per ton, or	£450
„ 1892,	75 „ „ „	£8 „ „	£600
„ 1893,	100 „ „ „	£6 „ „	£600
„ 1894,	185 „ „ „	£4 „ „	£740
„ 1895,	190 „ „ „	£6 „ „	£1,140

Mr. Weston's is probably the best Pear orchard in the county. Fruit experts are unanimous in the opinion that it will, when in full bearing, produce 400 tons of fruit.

GLEN UNA.

There is in Santa Clara County what may be called a model orchard—the Glen Una, situated about midway between Los Gatos and Saratoga, and owned by Mr. F. G. Hume. The entire tract covers an area of 680 acres, 350 of which are Prunes, 160 trees to the acre, this being the largest bearing Prune orchard in the world. It is not claimed that the profit per acre is as great as it is in some other instances, as the owner endeavours to secure quality rather than quantity. With this end in view, the trees are carefully pruned, and all the small imperfect fruits removed. This decreases the output, but insures choice fruit. The income, however, is from £20 to £25 an acre, though some of the trees are not yet in full bearing. Everything about the place is kept in perfect order. The trees are carefully cultivated and pruned, the roads are kept in good condition, the engine-

room is as clean as a parlour, and the fruit waggons are resplendent with bright paint and artistic lettering. The draught horses are all large, sleek, and fat, and the carriage horses are neat-limbed and of noble lineage.

Water is piped from springs upon the mountain side, several hundred feet above, to every building upon the place, under a pressure of 150 lbs. to the square inch. A hose-cart is provided for protection in case of fire, and the main buildings are covered with pipes, so that they could if necessary be quickly flooded. The buildings and various portions of the farm are connected with the engine-room by electric alarm bells. The residence and packing-house are connected with Los Gatos and all the principal towns in California, by long-distance telephone. A private electric plant furnishes both arc and incandescent electric lights for the residence, packing-house, drying-ground, stable, and other buildings, and also for the town of Los Gatos. The 15-acre plot used as a drying-ground, as stated, is also supplied with electric lights, and all work involving the handling and packing of the dried fruit is done at night in order to avoid the settling upon the fruit of the minute particles of dust set in motion by men and horses. Near the residence there is a grove of live-oak trees. From their branches depend a number of electric lights, and scattered about among the branches are a number of rustic seats. Near at hand there is a large cement plunge bath, supplied with a spring board and other accessories. A Grape arbour and trailing vines furnish grateful shade, and the pool is supplied with running water from mountain springs.

Twenty-five men are employed upon the place the year round, and from seventy-five to 100 in the season. Every company of men works under its own foreman, each foreman reporting to the superintendent, and he in turn to the proprietor. Everything moves forward quietly and as systematically as clockwork. It is all very much like a dream.

The packing-house is two storeys high, 55 ft. in width by 185 ft. in length, and is supplied with the latest and most improved machinery. It has also an elevator. The ground floor is of cement, and is kept very clean. The machinery is all propelled by steam power. The engine is a Putnam 60-horse power. It was built to order, and is a most beautiful piece of machinery. It is kept as neat and clean as the furniture in a

private house, and is housed in an expensive and model building. In another room of the engine-house there is a 55-horse power engine, which propels two dynamos, one of which is a Thomson-Houston 600 light alternator, and the other an Edison 250 light direct current. In the upper storey of the packing-house the Prunes are packed. As they are all extras they are packed exclusively in boxes. The room is 55 ft. by 185 ft., and there are two rows of incandescent lamps the entire length of the building. The packing-house is on a plateau about 500 ft. above San José, and at night the electric lights may be seen from a large part of the valley.

A tract of fifteen acres, in a little valley, about 100 ft. below the packing-house, is used as a drying-ground, and here are sometimes spread out as many as 18,000 white wood fruit trays, each 4 ft. by 8 ft., where they are allowed to remain until the fruit has been thoroughly cured by the warm rays of the sun. At intervals all about the grounds are lamps upon poles to furnish light for the men engaged in attending to the drying fruit.

Steel tracks extend to all parts of the grounds, and long trains of flat cars, loaded with stacks of fruit trays, are pulled to and from the various sections by horses. A railroad also extends from the drying-ground in the little valley directly up the steep hill to the packing-house on the plateau above, and this is worked by a cable from the engine-house. All parts of the packing-house and drying-grounds are connected with the engine-house by electric wires and alarm bells, so that signals may be given for the stopping and starting of the machinery. Every machine is connected separately, so that in case of accident it may be disconnected at once without stopping other machinery.

All fruit waggons, carriages, and farming implements are kept in perfect condition and freshly painted every year, a shop supplied with every requisite having been provided for the purpose. The ranche has its own blacksmith's shop also, which is supplied with lathes, forges, band and buzz saws, drills, emery wheels, and all other necessary machinery, power being supplied by a Pelton wheel propelled by water from springs in the mountains above. In winter, when the water supply is ample, the Pelton also drives a 150 light C & C dynamo, which supplies light for the residence and grounds.

The family orchard contains about 250 trees, including

Oranges, Lemons, Chestnuts, Cherries, Walnuts, Figs, and Pears. The annual income now ranges from £7,000 to £8,750. It was named Glen Una in honour of Mrs. Hume, whose Christian name is Una. The proprietor, who is only twenty-four years of age, was married in 1892 to Miss Una Handy.

DR. DUDLEY'S GRAPE FARM.

On the Almaden road, five miles from San José, Dr. J. P. Dudley has a beautiful place of 140 acres. Here he has practised experimental agriculture and horticulture for many years, and at the same time has made a success of it from a business standpoint. His genius for experiments has led him to seek to obtain from the fruits which he grew a knowledge of their special qualities, which would render them of great value as life-sustaining elements. In pursuit of this knowledge he discovered that a particular kind of Grape, treated in a certain manner, and used as food, possessed high nutritive and medicinal properties. The particular kind of Grape is one having a peculiar degree of acidity of the Rose of Peru type, and the treatment to which it is subjected is the condensation of the juice by a process of evaporation. Thus is obtained in a convenient form an abundant supply of tartrate of potash, which, when taken into the stomach as food, is converted into an alkaline carbonate. To obtain the proper quantity of this tartrate the Grape must be grown on a soil having a clay base. The action of the alkaline carbonate upon the human system is said to be to dissolve the uric acid, and, therefore, the concretions, and to stimulate every gland to healthy action. The medicinal qualities of tartrate of potash have been long known to eminent physicians of this country and Europe, but the idea of obtaining it from the Grape in a form convenient for use, originated with Dr. Dudley, and his success is due to years of study and experimental work.

MR. ZICOVICH'S VINEYARD.

A. Zicovich, who owns a 40-acre vineyard on the West Side, furnishes the following facts concerning wine-making:—The average crop ranges from three to five tons of Grapes an acre, the smaller and choicer varieties producing the former amount, and the commoner varieties the latter. In seasons when the rainfall is unusually abundant, and when it falls just

as needed, the crop ranges from five to ten tons an acre, varying, of course, in different districts. Only those Grapes showing 22 to 24 degrees by the saccharometer are used for wine, those showing less are used for brandy. One ton of Grapes makes from 135 to 160 gallons of wine, according to the variety of the Grape. The wine-makers are this season paying from £2. 8s. to £3. 4s. a ton for Grapes, and wine of this year's vintage is being sold for 7½d., 9d., and 10d. per gallon, according to quality. Wine sold early in the season for 6d. a gallon.

MR. HERBERT'S DRYING SHEDS.

In 1887 J. B. Herbert commenced to dry the product of his young orchard. He then found a few hundred trays sufficient for his needs. He subsequently commenced to buy fruit from surrounding orchards to dry. The business has since grown to such an extent that he has shipped this season seventy-six carloads of dried fruit. Mr. Herbert is a practical fruit grower, and knows what fruit is, how it should be packed, and what the market demands. He is constantly advised of the condition and demands of the market, and can therefore pay as much for fruit as any drying establishment in the county.

MR. FLICKINGER'S CANNERY.

A few years ago the only fruit canning plants in the State were located in San Francisco, and to these fruit was shipped from all over the State. As a result much of the fruit was necessarily picked when it was green. That which was allowed to remain on the trees until it was thoroughly ripe was entirely too ripe by the time it reached the cannery. It was then made into jams, which were unfit for food. J. H. Flickinger was at the time a wholesale dealer in cattle and sheep. He noticed the difficulties experienced by the cannery men, and at once planned to obviate them. His first proposition was, that instead of taking the fruit to the cannery the cannery should be taken to the fruit. He decided also that only the best varieties should be used, and of these varieties only the most perfect fruits. He accordingly purchased 500 acres in the Santa Clara County, which seemed to recommend itself as the choicest fruit-growing section. Having first determined which varieties were the most suitable for canning purposes, he selected and planted them.

Trained employés watch the fruit constantly. When it is thoroughly ripe, it is gathered and taken direct to the cannery the same day. At four o'clock in the afternoon the fruit gatherers cease work in order that no fruit may be left uncanned over night. In this way only the ripest and choicest fruit is canned. There is no long distance for the fruit to travel, as the cannery is in the orchard. The fruit, therefore, is left on the tree until it has attained its full size and developed its best flavour. An idea of the size of the fruit may be gained when it is stated that the smallest aperture in any can used here is $2\frac{1}{4}$ in. in diameter, and that many of the Peaches and Pears have to have parings taken from them before they can be inserted in the cans. These parings are subsequently dried. This alone shows that the quantity measuring over $2\frac{1}{8}$ in. must be considerable to make it worth while to dry the parings. Over 1,000,000 cans a year are used in this one cannery alone, and about 400,000 lbs. of sugar. It is one of the largest in the world.

HEALTH IN SANTA CLARA.

As regards the death-rate here and elsewhere, the following statistics compiled by the boards of health and other municipal authorities in various cities throughout the world will give a very clear idea of the standing of San José, the capital of Santa Clara County.

DEATH-RATE PER ANNUM PER 1,000 INHABITANTS.

Dublin . . .	35.70	Richmond (Va.) . .	20.10
Savannah . . .	33.75	Cincinnati . . .	18.89
Brussels . . .	30.66	San Francisco . . .	18.33
Vienna . . .	28.57	Philadelphia . . .	17.17
Berlin . . .	27.80	Sacramento . . .	16.78
Paris . . .	25.19	Milwaukee . . .	15.85
New York . . .	24.19	Los Angeles . . .	15.82
London . . .	23.62	Stockton . . .	15.33
Glasgow . . .	23.07	Oakland . . .	14.45
Stockholm . . .	22.52	Alameda . . .	13.40
Boston . . .	20.37	San José . . .	11.78
Baltimore . . .	20.31	San Diego . . .	10.88

SUMMARY.

Prune export of 1895 from San José, 40,000,000 lbs.

Santa Clara Co. has 111 miles of railroad.

” ” contains 1,754 square miles.

” ” has one of the largest seed farms in the world.

- Santa Clara Co. has the largest horse farm in the world.
- „ „ Cherries have netted over £260 an acre in one year.
- „ „ has 16,624 horses, 25,197 cattle, 2,972 sheep.
- „ „ has the largest University (Stanford's), with an endowment of £3,000,000.
- In „ „ there is not a month during the year when some kind of fruit does not ripen in the open air.
- „ „ has the lowest rate of taxation of any county in California save one—Yolo County.

No other section of the world produces the same number of varieties of fruit as are grown in Santa Clara County.

The number of trees in Santa Clara County in 1896 were as follows:—Apple 44,840; Apricot 535,099; Cherry 159,098; Fig 2,241; Lemon 1,554; Nectarine 894; Olive 17,886; Orange 1,835; Peach 405,731; Pear 144,877; Plum 45,562; Prune 2,961,114; Quince 1,308; Almond 24,050; and English Walnut 11,672.

No paper or papers ever written can express one half of the charms of the ideal country of California, or reveal its beauties, its glories and charms, as a fruit-growing district, as a health resort, as a centre of industry, or as an earthly paradise wherein one can reside, and spend the last few years of life, after the struggles and toils of many years of hard labour, worry, and trouble—a place for the poet, the artist, the novelist, the naturalist, the botanist, and in fact any who desire to see the beauties of nature revealed and expounded.

It may be well for me to reproduce the following prose gem by the late talented Bayard Taylor, whom death, alas! deprived of ever realising the fruition of his hopes. This is what he wrote:—“Then let me purchase a few acres on the lowest slope of these mountains, overlooking the valley and with a distant gleam of the bay. Let me build a cottage, embowered in Acacia and Eucalyptus and the tall spires of the Italian Cypress. Let me leave home when the Christmas holidays are over, and enjoy the balmy Januarys and Februarys, the heavenly Marches and Aprils of my remaining years here, returning only when May shall have brought beauty to the Atlantic shores. Here shall my Roses outbloom those of Pæstum; my nightingales sing, my

Orange blooms sweeten the air, my children play, and my best poem be written."

In conclusion I should like to tender my best thanks to the ranchers and other gentlemen who have so graciously given me such able assistance in the way of information, which has enabled me to lay before the Fellows of the Royal Horticultural Society an idea of the resources and advantages of this beautiful country of California.

SKETCHES OF WILD ORCHIDS IN GUIANA.

By EVERARD F. IM THURN, F.R.H.S.

NEARLY twenty-one years ago the Fates led me to Guiana and, nearly ever since, have detained me in the wilder and more remote parts of that region. Throughout I have taken an interest in the plants, and especially in the Orchids; and of late years whatever time I have been able to afford to botanical hobbies has been devoted almost exclusively to the somewhat arduous task of collecting, drying, dissecting, and drawing Orchids, many of them so small that an entire clump, root and all, and in full flower, would pass without touching through a finger-ring, and in making frantic efforts to grow these in my garden. It has been a long promise to the Editor of the "Royal Horticultural Society's Journal" that I should give him some notes of the experiences thus gained, and he now insists on the immediate performance of this promise.

I find myself embarrassed by the vast number of the scraps of Orchid lore which the abovementioned circumstances have put into my head, and still more by the desultory and unconnected character of the collection. Probably the only feasible way to fulfil my promise at present is to jot down certain pictures which remain in my mind of scenes in which Orchids were a prominent feature, and to leave it to my readers to pick out for themselves the scraps of information as to the natural conditions under which the Orchids mentioned grow, and as to the artificial conditions which may therefore be best applied in the cultivation of these.

Lest, however, my horticultural readers should after this

expect too much of me, I will add that the showiness of any particular species is but a small merit in my eyes. I have spent many more hours and much more thought over what I overheard a very famous English horticulturist, a few weeks ago, at one of the shows in the Drill Hall, refer to as "rubbish, or, as we will call them, 'botanical curiosities,'" than over the more showy plants. And, though to admit this is probably to destroy my own character for sanity, I am firmly convinced that the rational being would get far more delight out of the marvellous diversities and marvellous adaptations of some of my tiniest Orchids than out of the most splendid flower which, as the West Indian negro says, "fills the eye." But I promise that I will not here draw upon my experiences of the more minute aspects of Orchid life except in so far as this may be made to serve the purpose which I have in view in this paper of illustrating the natural conditions under which Orchids grow in Guiana.

The usual idea of the inexperienced is that Guiana is a land of Orchids; and so it is, but not of showy Orchids. It is doubtful if there exist in British Guiana a dozen different Orchids which the ordinary Orchid grower would care to have in his houses. Let me try what sort of list I can put together of the so-called desirable species. I should myself be inclined to put *Oncidium lanceanum* first for three reasons: (1) because it is a fairly common and accessible Orchid; (2) because of the great beauty both of plant and flower; and (3) because of the lasting quality of the flower. Then the two *Cattleyas* (*C. superba* and *C. Lawrenceana*) would come, though neither is easy to get; *Zygopetalum rostratum*—one of the commonest Orchids of the country—certainly merits a place; *Zygopetalum venustum* and *Z. Burkei* also come in; as does *Paphinia cristata*, *Ionopsis paniculata*, *Rodriguezia* (*Burlingtonia*) *candida*, and perhaps *Catasetum longifolium*. I doubt if there are any other "Gardener's Orchids" in British Guiana. And yet the number of species from Guiana to which I have devoted some attention is nearly 300, and many of these are very beautiful things even without the use of the microscope.

It may be well here to premise that the part of Guiana to which I shall refer lies entirely between 7 and 8 degrees N. of the Equator, and that, though the country does rise to a greater

altitude further inland, it is in the parts referred to either practically at sea level or at most not 50 feet above it; that the rainfall is heavy, the average for the year being about 90 inches; that this rainfall is distributed in two wet seasons in the year, the one lasting from December to February, and the other from April to September; that the temperature ranges from 66 degrees to 88 degrees; that the temperature falls very little during the night, and does not vary greatly throughout the year; and that almost the whole country is covered by the densest imaginable forest, only broken by the wider rivers and by small patches of "wet savannah," *i.e.* grass-covered swamps broken by many clumps of trees and by great stretches of an arborescent Aroid (*Montrichardia*), here and there by stretches of white sand reefs, also much broken by clumps of small trees, and, though not near the coast, by "dry savannahs," areas of rocky ground broken by coppices.

Orchids are to be found even at the edge of the sea; indeed, two of the best Orchids of Guiana, from the gardener's point of view, are there to be found.

The sea-coast of Guiana, where it has not been altered by the hand of man, is of a somewhat peculiar nature, due to its past history. It has been built up by the current from the mouth of the Amazon, which runs up in a north-westerly direction, carrying with it much matter from the Amazon and other rivers which it passes in its course. Where checked by the current from the Orinoko it has to deposit its load. Thus the shore is mainly built up of soft alluvial mud, which has been received on its arrival from the Amazon, and has been retained by the marvellously intricate thicket of mangrove roots quite into which the up current runs. Here and there, however, that part of the current which strikes on a particular part of the coast has brought not mud but sand and broken shell, which it there heaps up, and thus forms sandbanks, breaking the otherwise uninterrupted line of mangrove growth. Behind such a sandbank the mangroves often attain to a considerable size, and their trunks are not much obscured by young growth. It is high up on trees of this kind, exposed almost to the full blaze of the sun, that that most beautiful of all our Orchids, *Oncidium lanceanum*, grows most luxuriantly. It is, however, a widely but sparsely distributed species throughout the country. Though it

appears to be very difficult to grow in an Orchid-house, it is a most successful garden Orchid in the colony. Masses of it may be seen in the older gardens in Georgetown; and in one case in which one of these masses was sold for removal it was found to be too big for the cart which was sent to fetch it, and had to be divided.

The other Orchid which is to be seen in the same kind of place is *Diacrium* (*Epidendrum*) *bicornutum*, which clings to the more exposed boughs, and seems to enjoy the blaze of the sun and the full exposure to the salt-laden wind.

For many miles from the sea the broad rivers are edged by mangroves of large size, the otherwise bare trunks of which are in places almost clothed by the free-flowering masses of *Epidendrum fragrans* with its honey-like scent. Nearer to the water's edge great masses of the pretty little *Lanidium microphyllum* enjoy the shade of the overhanging boughs, and are sometimes bathed in the rising tide. *Brassia* and *Catasetums* are common. In places there are colonies of *Coryanthes maculata*, the roots of each matted together by ants into a round black mass. Two *Epidendrums* (*E. imatophyllum* and *E. Schomburgkii*) occur in the same places, and with much the same habits.

From the large main rivers one can penetrate into the dense forest which covers nearly the whole country by following up the course of one of the innumerable creeks.

To English ears a creek is a backwater, generally, I think, an arm of the sea; but in the originally Dutch colonies of Guiana the word means a stream or rivulet, or even a fair-sized river, provided it is not one of the main rivers of the colony. Here, however, we shall have to do with one of the innumerable small creeks or rivulets draining that great primeval forest which, except in the few places touched by the hand of man, stretches with hardly a break from where the crowded mangrove trees are lifted on their stilt-like roots over the mud-laden brackish water to the highlands of the interior.

From some forest swamp, often at a great distance from the main river, the water of such a creek gathers itself almost imperceptibly into a definite channel, down the intricate loops and coils and turns of which it creeps, generally in deep shade, and deepens for many miles, till (even its mouth almost hidden in

trees) it adds itself to the mighty gathering of its fellows which have already lost themselves in the main river.

Miners speak of the oozing of water from the over-saturated earth as "seepage." Such a creek as I mean is the seepage of the tropical forest swamp. It indeed has a channel—near the mouth often a deep channel—but it has, in its upper reaches, no banks, so that while part of its water hurries leisurely to the river, the rest spreads for an indefinite distance on each side; and there, having washed bare the fantastic tree roots, lies half stagnant, and loads and overloads the air imprisoned between the floor and the roof of the forest.

And just as the densely matted forest roof almost shuts in the moisture-laden air, so it almost shuts out the light of the sun. Even when at midday the tropic sun is reflected with most dazzling brilliance from the tropic sky above, here below there is hardly more than twilight pierced by countless tiny shafts of full light, which here and there strike through the less crowded leaves far down into the gloom.

The light is too faint for much plant life, and the black vegetable refuse which represents the soil is almost bare. Moss and such delicately small growths as cover our English ground are nowhere to be seen. What plants are there are mostly of striking and singular aspect, giving the scene a weird and uncanny look.

There are weedy clumps of great sedgelike plants. There are a few ground-loving Aroids with quaintly coloured and marked stems, with quainter heart-shaped leaves, and with quaintest flowers. There are ferns, some large and coarse-growing, the fronds of these loaded with the young plants, which would perish in the too great moisture below; others of lower stature and more delicately cut, the fronds of these often coated with the mud washed on to them by the last flood. Here and there—and these are the greenest patches—a beautiful and rampantly growing *Selaginella* has spread itself over places where the ground is a little higher; while close by, and in most beautiful contrast, are the broad oval leaves of the sweet-smelling Wood Lily (*Hymenocallis guianensis*), lifting toward the light its stately cluster of delicately white trumpet-shaped flowers, from which hang loosely down the curiously long, narrow, and quaintly twisted petals.

These are all comparatively low-growing plants ; but there are others which, springing higher, sparsely occupy the whole space between floor and roof. Here and there a few shapeless bushes, hardly clothed by scanty leaves, seem languishing for want of light. Here and there—though partly hidden by hanging dead leaves and fruits, mingled with hanging ferns and climbing Aroids—the massive column-like stem of a “Troolie Palm” (*Manicaria saccifera*, Gaertn.) tapers gradually upward from its small and sturdy base to where the magnificent uncut leaves, perhaps the largest in the world, curve gradually upward and outward. Or from a densely packed hillock of over-ground roots a cluster of perfectly straight, perfectly bare, slight-looking stems carries the most delicately cut leaves of the “Manicole Palm” (*Euterpe edulis*, Mart.), some to a height but little above the ground, others midway, and yet others piercing and overtopping the forest roof. Or a “Pimpler Palm” (*Astrocaryum*), generally of no great height, stands, its stem horrid with curious black thorns, long and flat and sharp.

Many quaint growths also hang down from the forest roof into this forest chamber. Sometimes an Aroid or a Fig, having perched itself aloft, has let down a single small root, as straight as a plumb-line, which either having reached the ground has there anchored and rooted itself or, without waiting to reach the ground, having sent out rootlets while its growing point still sways in the air, carries nutriment from the moisture-laden atmosphere to its parent above. Sometimes it is the leafless stem of a creeper, small it may be, or huge, round, or flat, or riband-like, or plaited, which hangs down from the roof in coils and loops and knots, or is stretched from tree to tree as taut as ever was rope. Sometime again it is the tree itself which, as if tired of drawing its water from so deep down as the earth to so high up as its own top, sends out masses of adventitious roots from some point on its own trunk, and so also draws an additional supply of moisture from the air.

Yet there are breaks in this curious land of twilight. Sometimes where a big tree has fallen and has carried with it many others—the prolonged crash of such a fall, which generally occurs in the stillness of the night, is a sound to be heard and then never to be forgotten—an oasis of light is formed. Sometimes a creek washes away more or less of the trees, the branches

of which swathe its bed ; and then for a time at least the water runs in the clear light of the sun.

It is so difficult to make words alone suggest the picture of the scene which is so familiar to oneself : a narrow streamlet of dark, untransparent water, well rounded masses of small-leaved shrubs, almost suggestive of willows, growing on both banks, right down into the water, their tops extending far above one's head as one floats in the boat ; behind these a few quaintly twisted, much branched trees, with but scanty leafage ; overhead the bluest of blue skies, sun, and the vapour of heat ; in front and behind alike the scene closed by the trees once more weaving their tops together over the dark tunnel ahead from which the stream emerges and over that other dark tunnel into which it passes.

Here too there are Orchids. From the cluster of five or six immensely tall, slender-stemmed, feather-crowned Palms, which in one place lifts itself above the bushes at the side of the stream up into the sky, hangs down, swaying in the wind, a single, immensely long spray of a very beautiful Vanilla, its heart-shaped leaves alternately arranged, with almost the regularity of an architectural ornament, on each side of the central stem, each leaf bearing from its axil a cluster of three or four exquisitely shaped flowers of a pale greenish colour, almost like that of a *Devoniensis* Rose.

The Palm so gloriously developed is one which the English nurseryman grows by the thousand and sells in small pots as table plants—*Euterpe edulis*. The Vanilla I have not yet been able to identify. It particularly affects this special Palm, but never seems to flower, though then generally in extraordinary abundance, except on these long single trails as they float freely from the Palm crown.

On some of the smallest twigs of the water-washed bushes cling the tiny Iris-like plants bearing comparatively enormous yellow flowers of *Oncidium iridifolium*.

Higher up on the same bushes, where the branchlets are somewhat stouter, hang clusters of the dark green leaves of *Rodriguezia secunda*, its long spikes of large, intensely ruby-coloured flowers looking more jewel-like than ever when one happens to see them against the strong light of that sky.

It is a constant wonder to me that the better forms of this

Rodriguezia are not more popular with gardeners in England. But the plant in its native home is a very variable one, and, though very common indeed, generally occurs in a puny form with pale, washed-out pink flowers; and it is probably these poor forms which have generally been imported and have got the plant a bad name.

In similar places, but very much more rarely, is another *Rodriguezia*, once called *Burlingtonia* (*B. candida*), with much broader, darker green leaves, and with huge white flowers of most exquisite texture, its beauty much increased by the pale lemon-coloured throat of the labellum.

A curious feature about *Burlingtonia* in its wild state is that one seldom seems to see it in the place in which it has grown. It is generally seen hanging head downward from, and at some distance from, a branchlet, to which, however, it is still attached by the ends of its long, white, wiry roots. I suppose that its more natural habitat is in the full blaze of the sun on the tops of some of the more moderate-sized, thin-leaved trees, where one's eye does not generally reach; and that it is only plants which have been half torn away, and so hang, that come within one's ken.

Passing out of the sunlight, through one or other of the tree arches which close the two ends of this open space, one passes at once into a quite different scene, and comes at once among quite different Orchids. Here, in a twilight which never brightens into daylight, the curiously twisted and buttressed tree-trunks, seldom of any great size, rise from banks of black leaf-mould over which the ground vegetation is rank yet sparse. The trees, meeting over the creek, lift almost all their leaves to the sunlight, while under the dense roof thus formed their own trunks and branches are swathed with Mosses and Lycopodiums and Pepperworts and Aroids and with curtain-like masses of pendent Orchids.

The most characteristic Orchid of the pendent habit just alluded to is a caulescent *Maxillaria*, which occurs in two closely allied but easily distinguishable forms. In both, the long and wiry rhizomes and much-sheathed pseudo-bulbs carry long grassy leaves and shortly stalked white or whitish flowers, individually beautiful and still more beautiful in the mass, which, by a not inapt comparison, are sometimes familiarly

spoken of in the colony as "snowdrops." I notice that in books *Maxillarias* of this habit are generally written of as "scandent"; but the natural habit is certainly not scandent but pendent.

On the same branches, almost always over the water, from which these *Maxillarias* hang down are a great variety of other Orchids, often in tangled masses. Many other species of *Maxillaria*, of the acaulescent section, cap the upper surfaces of the boughs in turf-like masses. From among these spring and, before they flower, wander far up among the tree tops, the long stiff stems of *Sobralia sessilis*, Lindl. Where the tree's branches leave the trunk, in the upper angles, nestle, their roots crowded with large black stinging ants, clumps of *Stanhopea eburnea*, its large white flowers most gloriously beautiful, among all other blossoms, in texture, and more intensely yet delicately scented than almost any other flower known to me. It has always seemed to me that the peculiar character of the great beauty of this flower is, in some way, especially suited to the natural circumstances in which it grows. But even apart from these natural circumstances the flower is surely beautiful enough, despite its evanescent character, to make it a worthy object for cultivation.

In similar places to those in which the *Stanhopea* grows, but generally near the ground, and so placed that its flowers can rest on the vegetable debris, are the two species of *Peristeria* (*P. pendula* and *P. citrina*).

Up the actual tree trunks, almost always on the side away from the creek and from the faint light which there prevails, closely cling luxuriant masses of one of the most beautiful Orchids of Guiana, *Zygopetalum rostratum*, its huge white violet-veined flowers standing out with almost startling clearness from the gloom in which it grows. On the lighter sides of the same tree trunks grow, not in masses, but widely scattered and singly, delightfully neat little plants of *Paphinia cristata*, its purple flowers, barred with white, extraordinarily difficult to see in the half light natural to it.

Much in the same sort of position as the *Paphinia* grows *Stenia pallida*, in two forms very distinctly marked, the one by broad, the other by narrow leaves. Another but much rarer Orchid, of very similar appearance, when not in flower, to the

Stenia, and growing in the same places, is a curious little *Zygopetalum*, as yet, I believe, undescribed.

Much higher up on the trees, but still completely in the shade of the leafy roof, and almost always overhanging the water, are most attractive looking and handsome-leaved masses of one or more species of *Gongora*. From these hang down the necklace-like strings of flowers, which though certainly not showy, and, taking the size of the plant into consideration, not worthy of cultivation in small houses, are most quaint and most decorative. Forms of very various colours occur : white, yellow, brown, purple, and of a dark chocolate ; and in some of these darker forms a bright yellow labellum adds very greatly to the beauty of the flower. But I have never been able to satisfy myself that I have seen more than one species.

Nor has the variety of Orchid life in such a creek as I have been imagining even yet been fully indicated. Here and there a small tree, often a *Calliandra*, does not rise to the forest top, but stretches its branches and branchlets, often very sparse-leaved but thickly set from end to end with its feathery close-nestling pink or white flowers, out into the vacant space over the creek water. The smaller branches of such a tree, often matted together with mosses and Liverworts, have perched upon them, as it were, a number of very small Orchids, *Pleurothallis* and *Masdevallia*, with mosquito-like flowers, and fan-shaped plants of two small species of *Ornithocephalus* (*O. Ibis* and *O. Cruegeri*), and many others.

I may pause for a moment to recommend anyone who cares to see a really marvellous thing in the way of beauty of form and beauty of adaptation to grow these or similar small species of *Ornithocephalus*, to examine the flowers carefully under the microscope, and more especially to watch carefully the exquisite contrivances which are revealed when the pollinia are released.

Let us now wander in imagination higher up some creek, some creek which has its source, not in the mere drainage of a swamp, but from some of the low hills, the original coast line of the country, which penetrate into the more lately deposited alluvial tract, with which we have hitherto been chiefly dealing. At the head of such a creek the bottom is often sandy, and the water, no longer muddy but clear as crystal, is of a beautiful and deep wine colour. (I often mentally praise the old Greeks

who provided us with that most apt colour phrase which so exactly expresses a tone which one means without binding one down too closely to the colour of any particular wine.) Broad-leaved Aroids grow in the stream at the sides, their leaves and white or green flower-spathes constantly swaying with the current. Here and there a fallen tree, often, in these higher grounds, of some size, lies across the water, its upper surface covered with a close-growing carpet of thin moss, its lower surface almost constantly wetted by the running water. On the higher part of such a trunk are grass-like tufts of *Zygopetalum graminifolium*, its erect, hair-like flower stems carrying two or three most daintily beautiful yellow, brown barred flowers, its thick fleshy white roots at first twisted much together, and then spreading out over the surface of the bark and reaching down far enough to bathe their growing points in the water. On both sides of the trunk, just where the deeper colour of the moss indicates the average height to which the water level of the stream rises at certain seasons, the turf of the moss is everywhere penetrated by the threadlike wiry rhizomes of a very minute but very lovely *Pleurothallis* (? *P. acutissima* of Coigneaux' "Flora Brasiliensis"), the tiny, acutely pointed leaves of which are hardly distinguishable from the mossy covering of the bark, while the small purple twin flowers, in that they are carried well over the foliage, are only a little more easily seen, though if put under the microscope they appear as amongst the most gorgeous of Orchid flowers.

A few sandstone rocks crop out over the surface of the water, their tops above water level clad with similar moss to that on the tree trunk. Higher up the stream, toward the head of the miniature reach, these rocks are more numerous, barring the water, which there dashes through the channels between the rocks with some small force. On the higher parts of such rocklets, ever wetted by the spray from the top falls, grow exquisite little clumps of a rare and beautiful little Orchid, *Cheiradenia cuspidata*, each plant a delightful little cluster of leaves, well over which the very fine but sturdy flower stalk carries the magnificent little flowers.

I cannot refrain from giving one more creek scene, this time much nearer to the sea. The deep sluggish water here winds through a swamp almost entirely covered by masses of a prickly palm (*Bactris leptocarpa*, Trail), the grey-green stems and

feathered crowns of which rise in a wild tangle to a height of about 20 feet above the water level. On these stems, among the flattened grey thorns which thickly clothe them, fully exposed to direct sunlight at midday from overhead, cling loose masses of *Bifrenaria longicornis*, Lindl. Through the Palm stems, something white, a little way in the swamp, attracts the eye; and a second look discloses that this is the white flower of *Aganisia pulchella*, which in some places, hardly ever seen by human eye, creeps up many of the Palm stems.

Occasionally, very occasionally, in that vast stretch of forest and creek there are open places—"wet savannahs" they are called—where the creeks wander for a time no longer under the trees, but through great water meadows of long grass, over which in the wet season the water spreads and makes a lake. In such places, breaking the grass stretches, are many clumps of low bushes and far-reaching groups of arborescent Aroids (*Montrichardia*). On these bushes, almost weighing them down, are vast masses of an *Epidendrum* (*E. oncidoides*), with thickly clustering, very upright pseudo-bulbs, and narrow, very erect, and stiff leaves. The innumerable straw-coloured flowers of this *Epidendrum*, tossed up into the air on very long flower-stalks, sometimes in such profusion as almost to dim the light, fill the air with a scent as of newly flowering Hawthorn. Thickets of this Orchid thus seen in all the supreme beauty and lightness which come to them in the flowering season make a picture which does indeed brighten all after-thought. Nor is this the only, perhaps not even the most striking, of the Orchids of such places. From innumerable of the smaller branches of the bushes, and from many of the woody aroid stems, hang loose clusters of *Ionopsis paniculata* with its light clouds of pale violet-coloured flowerets, apparently hardly held together by anything substantial enough to be called a stalk.

Again in other places is there very occasionally open country, but this open country is dry. There reefs of almost pure sand, so whitened by the tropical sun as to dazzle the eye, are broken by coppices and clumps of low-growing gnarled trees and a few bushes, all of special kinds. Such places also have their special Orchids. Up the tree trunks grows, often in great abundance, a very small brown-leaved and stemmed *Vanilla*, with beautiful little flowers of almost pure white. On the ground, where the

trees, thin as they are, yet give some shade, grow *Catasetums* of more than one species, as well as a *Brassia*, perhaps unnamed, but certainly not beautiful enough to be an acquisition to gardens. And in the deeper shade grows one of the rare terrestrial Orchids of Guiana, a *Microstylis*.

Outside the clumps of trees, but where the shadow of these occasionally falls, are thickets of a *Cyrtopodium* with gigantic pseudo-bulbs, often three or more feet long, over which rise the splendid masses of yellow flowers.

I have left myself no space to speak of the forest country further inland, or of the open highlands, to which the name of savannah more especially belongs, yet further in the interior. If the Orchid pictures which have already been given are of any interest to the readers of the Society's Journal, possibly the editor will allow me on a future occasion to tell of the homes of the *Cattleya* and *Selenipediums* (of both of which genera, however, there are but few species in Guiana), as well as of my own greater favourites, *Trichocentrum*, *Quickettia*, *Octomeria*, and so on.

I cannot, however, close the present paper without justifying my appearance in a journal of this nature by one suggestion which I suppose may be picked out as the one practical point of what I have here written.

I have found by experience in my own garden (which it must, however, be remembered is in the tropics) that a great many small Orchids which it seems difficult or impossible to establish in pots or on blocks, or in any of the ordinary methods of the garden, can be established very readily—so readily that in the tropics they soon seed themselves freely over the garden—on growing plants of garden shrubs. Such shrubs as the various species of *Tabernæmontana*, *Jasminum*, *Gardenia*, *Hibiscus*, *Coffea*, and even “Crotons,” make suitable hosts for *Ionopsis paniculata*, as also for the much rarer *I. teres*, for *Oncidium iridifolium*, *Rodriguezia* (including *Burlingtonia candida*), and, in short, for most of those which grow naturally on the outer branchlets of trees or shrubs, and are consequently much exposed to the sun, and are at the same time provided with ideally perfect drainage. The conditions in an English stove of course differ very materially from those of a tropical garden; but it would perhaps be worth the experiment whether some of the small “difficult things” might not be grown on living hosts.

FLORAL DEMONSTRATION.

By the Rev. Professor GEORGE HENSLOW, M.A., F.R.H.S.,
V.M.H., &c.

[Given March 8, 1898.]

PROFESSOR HENSLOW commenced by alluding to a plant of *Iris persica* and one of *Cyclamen Coum*, interesting historically as being the first and fourth plant respectively illustrated in Curtis' "Botanical Magazine," vol. i. They have thus been in cultivation for upwards of a century, but show little if any improvement.

Specimens of *Sarracenia* in blossom afforded an opportunity of describing the method of catching insects adopted by this genus, which decay within the trumpet-shaped leaves through bacteria, and afford some nourishment, by absorption, to the host plant; but under cultivation the flies are often so numerous as to destroy the pitchers themselves, the only preventive being apparently the plugging the mouths with cotton wool. Allusion was made to the fact that in America a certain moth drops its eggs into the decaying débris, when birds subsequently slit open the tubes and extract the grubs. Mr. Henslow had even found the decaying mass of insects full of the grubs of the blow-fly. The flower was described and the movements of the shield-like stigma, first noticed by Mr. W. G. Smith, to allow an insect to enter beneath it and then escape with pollen, when the stigma became depressed again.

Erica and *Epacris* supplied an illustration of representative plants. Though much alike, but of different orders, the former is from the Cape, the latter from Australia. The interpretation of the similarity is that they both grow under similar climatal conditions, the plants having "responded" to these, and consequently assumed a like physiognomy.

Bryophyllum calycinum, from Madeira, &c., illustrated a peculiar method of vegetative propagation, inasmuch as the leaflets fall off before decaying and strike root, then produce buds at the notches on the margin. Professor Henslow pointed out the analogy between this and a carpellary leaf with ovules, as exemplified in a Pea pod.

Some hybrid Orchids, raised by Mr. Veitch, between species of *Epidendron*, with subsequent considerable variations in the results, called for observations ; as well as one between *Dendrobium Wardianum* and *D. japonicum*, a much smaller flowered species without any yellow in the lip. That in the labellum of *D. Wardianum* was completely obliterated, a purple spot being only retained.

A hybrid sent by Sir T. Lawrence, called *Azaleodendron*, suggested some remarks upon what a species really was. Formerly it was thought to be a fixed entity, and that nature did not permit a hybrid to be fertile. This, however, has long since been disproved. Species were recognised by systematic botanists solely by the forms of the flowers, foliage, &c. But when two plants, regarded as belonging to different genera, e.g. *Azalea* and *Rhododendron*, were found capable of being crossed, then the offspring was either called a "bigener," or else "form" was ignored, and both parents were said to be of the same genus.

"*Amaryllis*," *Hippeastrum Pardina*, exhibited by Mr. Veitch, illustrated a case in which no benefit had followed from crossing, the flower being rather small, inferior-coloured, and the stem weak ; but *A. Leopoldina*, obtained simultaneously with the preceding from Peru, had been crossed with well-established and old crosses, and so brought about an excellent strain, this species having imparted a broader and flatter mouth to the perianth. The Professor drew attention to the slight irregularity which occurs in this flower, in that the lower and front petal is the smallest and not streaked with white as the others. Moreover the stamens are declinate. He observed that most flowers, in which the stamens formed the support for, and bore the weight of the insects, assumed the above type of character ; in which the lower petal was more or less atrophied, and even sometimes completely obliterated, as in the Horsechestnut.

A group of *Cyclamen* with fringed petals represented a new "break" in this plant, a result of hypertrophy and a feature occurring in other flowers as well, for it has appeared in *Begonias*, greatly enhancing the beauty of the flower.

THE COOKING OF VEGETABLES.

By Dr. BONAVIA.

IT is not always easy to give recipes for cooking vegetables without an accompaniment of meat, fish, or eggs. Some vegetables admit of being cooked alone. For instance, I know nothing nicer than good honest potatoes, simply boiled and eaten hot with good butter and salt. Being myself half Irish, I look upon this homely dish as "very pretty eating," as it was called by an Irishman. Many vegetables are used in combination with meats of sorts, with fish, and with eggs; and therefore, in order to make this paper more useful, I shall, here and there, allude to certain combinations of vegetables with other materials.

It is a curious phenomenon of the human brain that cookery had been for long looked upon as a *vulgar* occupation. We think a great deal of things that are pleasing to the sight, such as pictures, flowers, pretty furniture, pretty dresses, &c. We think a great deal of scents that are pleasing to the olfactory nerves. We also think very highly of charming sounds, songs, music of all sorts, that fascinate the organ of hearing. But, curiously enough, when we come to things that please the palate, our common sense seems to fail us. We seem to look upon the pleasures of the palate as akin to *gluttony*. The reason of this seems to be that, while indulging in these pleasures, we have to introduce into our interior economy something *material*, and the handling of the raw materials in the kitchen is not always very fascinating.

No doubt eating and drinking have been often abused, not only in ancient, but also in modern times. Indeed, the mediæval Church set upon its lists, as great sins, what may be vulgarly called "the sins of the belly," or, as the Italians called them, "*peccati della gola*"; that is, "sins of the gullet." In my opinion, however, cookery ought to be considered as one of the fine arts. It is not only an art, but also a science, much like chemistry, with the great advantage that, unlike the latter art, cookery does not frequently evolve such odiously bad smells.

The kitchen should be looked upon as a laboratory, where innumerable combinations of different kinds of food-

materials can be worked up into, not only pleasure-giving, but also health-giving compounds; for to eat a thing with pleasure is a great aid to digestion, and, without good digestion, good health is hardly possible. The gardener and the cook are a pair of very useful creatures in civilised life. In the words of the Very Rev. the Dean of Rochester (*Nineteenth Century* for April, 1898, page 646): "Seriously, these subjects of horticulture and cookery are of great national, social, and moral importance. . . . If a man does not find happiness at home, he will seek it elsewhere in vain; but when, after his day's work is done, you refresh his eyes and his palate with the results of his own handiwork, you do much to make him satisfied with his surroundings, and to restrain him from wandering to those perilous places where wild asses quench their thirst."

In concluding this little preamble, let me tell you that you cannot have savoury dishes without the use of onions, garlic, olives, grated cheese, and various other condiments. I know that some people have a horror of onions and garlic in any form. These strongly scented ingredients should, however, be used so judiciously as to present to the palate a sort of "bouquet" of flavours. In short, they should be used much as perfumers use musk and civet to produce the various scents which ladies and other folk are so fond of.

Let us now commence with the

Aubergine.—Some time ago I procured some seeds of a very choice variety from Delhi in India, called there *mároo baingan*. I have a suspicion that *mároo* is simply a corruption of the English word *marrow*, owing to the marrowy softness and flavour of this delicious vegetable. Well, among others I sent some of the seeds to the Rev. Mr. Wilks, our esteemed Secretary. He made them over to the official in charge of the Chiswick Garden, and in due course they produced fruit; the report I got of them was that they were pronounced *nasty*! Certainly the raw aubergine is nasty, and, simply boiled, it cannot be called nice. In this case it was simply boiled, and I do not wonder it was not found fascinating. Mr. Wilks himself, however, had some fried in butter, and pronounced them decidedly nice.

There are several ways of cooking this aubergine, or *brinjal*, as it is called in some places.

(a) Remove the stalk and bracts, or enlarged calyx, cut the

fruit in slices lengthways, of the thickness of two or three half-crowns, and fry them in plenty of oil or lard till they are of a light brown on both sides, and serve them hot, either alone or as a vegetable with meat. Of course salt is to be used with them.

(b) Cut the aubergines in halves lengthways, and boil them till quite soft; squeeze them between two plates, to rid them of the slightly bitterish water they contain. Then scoop out the interior and chop it up roughly. When cold, dress it with oil and vinegar, pepper and salt, and use it as a salad. The aubergines for salad are nicer when baked whole in a dwindling oven. They will be shrivelled a good deal when done. When cool, take off the skin, chop up the pulp roughly, and use it as a salad as before. It should be understood that the pulp, when sufficiently baked, should be of a marrowy softness.

(c) The nicest way, however, of cooking this vegetable is as "stuffed brinjals," or "aubergines farcies." This, of course, is a combination of aubergines and two kinds of meat, with other condimental materials, as follows:—Remove the stalk and bracts and cut the aubergines lengthways in halves; boil them to tenderness as before, and squeeze them between two plates to get rid of surplus water; scoop out the interior, leaving only the shell with a thin layer of the pulp; shape them like little boats for stuffing. The round kinds are the best for the preparation of this savoury dish. In the meantime chop up finely, through an American mincing machine, some fresh pork with the fat on and some fresh beef. While this is being done, chop up a couple of good-sized onions, and fry them in lard; when nearly done, throw in a good tablespoonful of chopped parsley, add the minced meats, two tablespoonfuls of grated Parmesan cheese, pepper and salt, and stir the whole on the fire for half an hour; after having added the chopped-up pulp of the aubergines. When the whole is cool, mix in thoroughly a couple of eggs beaten up, and stuff the aubergines with this compound. Smooth the surface and sprinkle some more grated cheese over the surface of each, and bake them in a pan previously smeared with lard, till the surface of the "aubergine farcie" is of a light brown, and serve them hot as a separate dish. If well made, this dish is supremely nice. Its perfection can only be attained by practice, and connoisseurs will not fail to enjoy it.

(d) Aubergines baked as before, and pulped, will make a

very nice curry to be eaten with nicely boiled rice and chutney. This vegetable curry in India is called *chickki*. All vegetable curries bear this name.

Cabbage.—Besides the simply boiled cabbage, there are two other ways of cooking this vegetable.

(a) Steam some nice sort of cabbage till quite tender, and squeeze it between two plates to get rid of excessive moisture. Chop it up finely. Boil or steam some mealy potatoes, and press them through a squeezer, and mash them all up with the cabbage. Put the whole in a saucepan on the fire with a good pat of butter, half a breakfastcup of creamy milk, and a good sprinkling of salt. Heat the whole, and stir frequently till the mass becomes like thick porridge; serve hot as an accompaniment to meat. This is an Irish dish, and I have never seen it done well except by Irish people. It is called "kalecannon." It is very nice indeed, but requires practice to proportion the ingredients nicely. It can be varied by mixing all the ingredients as before, and baking the whole in a buttered dish in the oven till the surface of the mass acquires a rich brown colour. A good deal of butter is required to make a nice "kalecannon."

(b) Stuffed cabbage or "choux farcis." This is a very interesting dish. Prepare some minced fresh pork and beef—as for stuffed aubergines—season with chopped onions, pepper, salt, a few pinches of ground cinnamon and cloves, and a good proportion of grated cheese; mix in a couple of beaten eggs. In the meantime half steam a nice small cabbage, separate the leaves, and lay them flat on a dish. In the middle of each cabbage leaf place a full tablespoon of the minced mixture, and envelope the whole in the leaf. Put a few coils of thread round each ball to prevent its becoming undone in cooking, and when all are thus prepared stew them gently in a rich gravy, so that when they are cooked they will become glazed over with a condensed gravy. Dish the "choux farcis" one by one, cut through the thread and remove it, and serve them hot. I have eaten these "choux farcis" made by a first-class cook, and they were exceedingly nice.

Cauliflower.—Besides the English way of serving cauliflower simply boiled with an insipid white sauce, there are two other ways of cooking this fine vegetable.

(a) Steam a nice cauliflower till it is quite soft, but not

overdone. When cool divide it into branches. Then beat up a couple of eggs, and turn each branch of the cauliflower in the beaten egg, so as to smear it all over with egg, and fry it in lard, turning each piece in the frying-pan, till it is of a golden-brown; serve hot. I do not know any vegetable dish nicer than this one when well done. White broccoli is not half so good as cauliflower, which, when nicely cooked, is of a marrowy consistence. The sprouting purple broccoli is a totally different thing. Simply steamed it is very nice, eaten with pepper and salt as a meat accompaniment; but there is a nicer way of cooking it. Steam the sprouting broccoli, fry some chopped onion in lard or butter, add some minced parsley, and toss the broccoli gently in it without mashing it; serve hot.

"Choufleur au gratin" is sufficiently known, but there is usually one great omission in this dish. It should have a good deal of grated Parmesan cheese mixed up with it; and grated cheese should be sprinkled over the surface before baking it. This dish requires a good deal of butter. There is one other way of using steamed cauliflower which is not generally known. Divide one or more cauliflowers into branches and steam them till quite tender; serve quite hot with lemon juice, olive oil, and pepper and salt, as a sort of hot salad.

Steamed cauliflower divided into branches makes a capital accompaniment to a fish-pie, with olives (with the stone cut out) fried, chopped onions, and parsley, pepper and salt. This in Italy is called "*pasticcio di pesce*." The paste of this pie should be kneaded with oil and red wine instead of with water; salt should never be omitted in the paste.

Onions.—There are two kinds of onions, viz., the flat white onion, which, when boiled, has a marrowy consistence; the other is the large Spanish onion, which, when boiled, has the consistence of leather. Why growers try to produce the largest onions, sometimes as large as a cannon-ball, as if they were meant for feeding cattle, I do not know. I think onions should be boiled, not steamed, because the boiling water washes out a good deal of the rankness of the onion. There are two nice ways of using whole onions.

(a) Boil some white flat onions to marrowy tenderness, squeeze them slightly between two plates, and serve hot, to be dressed with oil and vinegar, pepper and salt, and eaten as a

hot salad. The boiled onion, eaten hot, has a nicer flavour than the same onion allowed to cool.

(b) The best way of cooking the leathery Spanish onions is to use them as vehicles for cooking kidneys, in the following manner:—Cut off a third of a Spanish onion; scoop out the interior sufficiently, so as to hold a kidney; chop up the scooped portion finely, mix it with a good pat of butter, add pepper and salt, put the kidney in the hollow of the onion, stuff in the chopped onion and butter, put on the third which has been cut off, as a sort of cap or cover, and bake in a brisk oven for two hours. The green leaves of young onions are generally thrown away, which is a mistake. If the leaves are cut up and fried as a condiment, they are as good, if not better, than the bulb.

Artichokes.—The English way of cooking them is to boil them, and eat the bases of the bracts with melted butter or a white sauce. The same boiled are nicer if eaten with a sauce made of oil and vinegar, pepper and salt.

Another way of cooking the matured and large artichokes is to prepare a stuffing of finely chopped garlic, finely chopped parsley, and breadcrumbs, seasoned with pepper and salt; stuff this “compo” between the bracts, pour oil over the whole, arrange the artichokes in a baking-dish stood upright, close to each other, and bake them in an oven till the bracts loosen easily. They are to be eaten in the usual way, by biting off the soft base of the bracts, flavoured with the stuffing. The principal and best part of these large artichokes is the receptacle, freed of what is commonly called the “choke.” The Italians, however, use the artichoke *bud*, that is the artichoke, when quite small and tender, as follows:—The outer bracts of the small artichoke are removed. It is then steamed, and when cool split into two halves, and fried in good French batter as *artichoke fritters*. If well done, these are very nice.

Salsify.—Scrape the roots and steep them in water for a couple of hours, then boil them to tenderness. When cool they make an excellent salad with mayonnaise sauce.

Another way is to cut them up after boiling them, and fry them in good French batter, to be served hot as salsify fritters. If well done, this is one of the choicest fritters.

Still another way is to cut up the boiled roots and cook them exactly as you would baked oyster scollops.

Parsnips.—Choice varieties of parsnips are the only kinds worth eating. The ordinary way is to boil them like carrots. But when boiled and sliced and fried in good French batter, they make excellent fritters. Of course, in all this sort of cookery, practice is needed, in order to make a choice dish.

Vegetable Marrow.—The great fault I find in the way vegetable marrows are used in England is this:—They are allowed to remain too long on the plant before plucking. The consequence is that they are full of seeds and flavourless. If plucked of the size of a lemon, they are much nicer, whatever way they may be cooked in. The plant will go on producing others of the same size, so there is no waste. There are several ways of cooking these nice little marrows.

(a) Slice them crossways, each slice of the thickness of two half-crowns, and fry them in lard, to be eaten with salt as an addition to meat or fowl.

(b) Cut them in halves lengthways, scoop out the interior carefully, and stuff them with minced meat, flavoured with minced spring onions, parsley, pepper and salt, bound with a whipped egg; cover with breadcrumbs, and bake until the surface is browned. This “courage farcie” can be varied by making the stuffing of fish, flavoured with onions, thyme, &c., but preferably with tinned sardines.

(c) Cut up the marrows into inch cubes; place them in a pot with some finely sliced onions, some sliced green or red chillies, and a lump of butter and some salt, and stew them on a slow fire *without* any water. They will stew nicely “in their own juice,” and make a capital hot vegetable dish.

Mammoth gourd or *Potiron*.—This fine vegetable is scarcely ever seen in England. All the same, it is one of the finest vegetables, of a sweetish taste when cooked. Some varieties grow to such a size when ripe as to be a load for a man. This gourd will keep for a long time in a dry place, and pieces of it can be used as required. There are different varieties of it, some of a yellow and others of a reddish colour when cut. The seeds should be shaved off for cooking purposes, and the thick and hard rind cut away. When cut up into $1\frac{1}{2}$ inch cubes, steamed to tenderness and pressed through a sieve, it makes a capital gourd soup, like pea-soup or tomato soup, or Jerusalem artichoke soup. But the best way of cooking this interesting vegetable is the

following :—Take a thickish slice of gourd, and after removing the seeds and rind cut it up into $1\frac{1}{2}$ inch cubes and stew it in its own juice on a slow fire, with the addition of a finely sliced white onion and a chilli cut up, and, of course, with some salt. No water is required, but only an occasional stirring. It can be served as a vegetable with meat. When the gourd is quite young, of the size of an orange, it can be cooked as a vegetable marrow; indeed, it is then one of the marrows. A very nice sweet dish can be made out of this gourd. Cut up as before, steam, and press through a sieve. The result will be a purée of gourd. Mix in a whipped egg or two, some sugar to taste, a spoonful or two of cream, a little flour, and a seasoning of ground cinnamon, and a pinch of salt. Mix up the whole well, take up tablespoonfuls of this purée, and fry them singly in lard on both sides. Dish them in layers, sprinkle finely ground sugar over each layer, and serve hot as a sweet dish. A very good pudding can also be made out of the gourd purée.

Peas.—The cooking of peas is sufficiently known in this country, but the Indian way of cooking peas is in my opinion the best. Put the shelled peas into a stone jar with a screw top, with some fresh mint. Add two teaspoonfuls of water, a good pat of butter, half a teaspoonful of sugar, a few pinches of salt, and a little pepper. Give the whole a stir with a spoon, screw on the top, and cover all the top with some flour paste in order to keep in the steam. Then plunge the jar in a pot of boiling water, and keep it boiling for a couple of hours. Remove the paste and screw top—surround the jar with a clean napkin, and hand round the peas, to be ladled out with a spoon by the diners. The French way of cooking *petits pois*, as a separate dish, is a very nice one.

Broad beans and young French beans are best cooked in the way the French cook peas. But young French beans make a good hot salad as follows :—Steam them with a number of young silver-skinned onions, and serve them hot, to be seasoned with oil and vinegar, pepper and salt, as an accompaniment to meat. The mistake is often made of leaving the French beans on the plant till they become too large and hard. Then they are hardly worth eating.

Knole Kole.—This is a vegetable of the cabbage tribe, with a turnip-shaped stem above ground. When of the size of a

small orange it is very nice when cooked. Peeled like a potato, with a knife, cut into halves or quarters and steamed, it makes a good hot salad with lemon juice, oil and pepper and salt. Simply steamed, it is very nice as an ordinary vegetable, mixed up with its own tops. Peeled, cut up, and stewed with meat, it is very nice.

Tomato.—I have eaten tomatos simply grilled, as an accompaniment with a mutton chop. But grilled tomatos are not so good as tomatos cut in halves cross ways, and fried in lard to softness, or till the rawness disappears. If they are only to be half done, it is better to eat them quite raw as a salad. Baked tomatos in a pan smeared with lard are very nice when eaten as a vegetable with pepper and salt. But the tomato admits of being cooked in various ways, with meat, eggs, or fish ingredients, as follows:—

(a) *Stuffed tomatos.*—Take some smooth round tomatos, cut off the stalk end, and scoop out the seeds from the centre, but not the pulp round the skin. Fry some chopped onions in lard to softness with a minced clove of garlic and some minced parsley. Mix in some minced meat, or fowl, or fish—preferably tinned sardines. When cool, bind the whole with a whipped egg and a little breadcrumb; season with pepper and salt and a pinch of ground spice; stuff the tomatos with this mixture, smooth the surface and sprinkle over it a little breadcrumb and bake in a dish smeared with lard till the surface is browned.

(b) *Tomatos and Eggs.*—Peel some ripe tomatos (two, three, or four, according to need); cut out the stalk centres, cut them up and fry them in butter till they become dissolved, no raw bits should remain uncooked; season them with pepper and salt. Beat up three, four, or six fresh eggs, according to need, but do not beat them too much. Pour the eggs into the tomato-pan, and stir gently till the eggs are almost set. Serve hot on toast. If the tomatos are quite ripe, the eggs fresh, and the butter “best butter,” this is a very nice breakfast dish. The eggs should not be allowed to become *solid* on the fire.

(c) But one of the best ways of cooking tomatos is the following:—In a baking-dish or pudding-dish place a layer of sardines from a newly-opened tin, spread over them a layer of finely sliced young white onions (spring onions are the best), over these sprinkle a tablespoonful of capers, and a heaped dessertspoon of

fresh marjoram leaves; add pepper and salt; pour over all a tablespoonful of good olive oil, and cover the whole surface with ripe tomatoes cut in halves crossways, the cut side downwards; sprinkle over all some breadcrumbs, and bake in a quick oven. If you do this tomato dish properly, you will repeat it often and will never forget it. The onions, capers, and marjoram are *de rigueur*.

Potatos.—The cooking of potatoes is sufficiently well known in England, but a few ways of cooking potatoes which are not commonly known may be mentioned here.

(a) *Potato soufflé*.—Boil good oval-shaped potatoes. When cool, cut off one end and scoop out the interior of the potatoes, leaving about a florin's thickness all round under the skin. Mash up what you have scooped out, mix in some cream or melted butter, a little grated Parmesan and a whipped egg, and season with pepper, salt, and a pinch of spice. Fill the scooped-out potatoes with this stuffing, smooth the surface, place them side by side in a baking-dish, and bake till the surfaces are browned. To be served hot. If you have any meat or fowl left, chop it up, grind it in a Wedgwood mortar, and add it to the stuffing.

(b) The most savoury way I know of cooking potatoes is in an

Irish Stew.—The English way of making an Irish stew is to cut up peeled potatoes, with sliced onions, and stew them in an open pot with mutton neck-cutlets. This dish is nice enough, but it wholly lacks the marvellously appetising flavour of a *real* Irish stew, which is made in the following manner:—Begin by placing at the bottom of the pot some old plate, face downwards, over it place a layer of whole middling-sized peeled potatoes, over that a layer of sliced white onions; season with pepper and salt; then again a layer of mutton or lamb cutlets; go on building up the same layers—potatoes, onions, pepper and salt, and cutlets, or shortenings of ribs or pieces of brisket—until the pot is nearly full, pour in by the side of the pot a small teacup of water. Then—and this is the most important part of the performance—cover the whole with a slab of paste worked up with suet and well tucked in at the sides, and cook on a slow fire for a couple of hours. This stew should be kept simmering all the time at boiling-point. The object of the plate at the bottom, of course, is to prevent the ingredients from being burnt, and the object of

the paste is to keep in the steam and with it the aroma of the stew. If properly done, the potatoes become throughout impregnated with the aroma of the onions and of the meat, and are unequalled in flavour by any other form of cookery. When the whole is cooked, take up the slab of paste carefully and place it upside down on a hot dish, and tumble out carefully the stew over it. There should be just a little gravy, but never a lot of gravy as if it were a soup. The paste, if well made, becomes also impregnated with the aroma of the stew, and is very nice and juicy if it is not made too thick. Such is a *real* Irish stew. Practically it is a potato stew cooked by steam. In the English mode of making an Irish stew the whole aroma escapes with the steam and is lost. There are not many that can make a real Irish stew, unless they have been taught by Irish people.

In conclusion, I would remark that it is no more possible to make a good cook by giving him or her recipes on paper than it is possible to make a good pianist by giving him or her a piece of music on paper. Practice and intelligence—and shall I say an appreciative diner?—are *essential* to the evolution of a good cook.

HORTICULTURAL SOILS.

By MR. J. J. WILLIS.

[Read March 22, 1898.]

THE question of soils must always be an important subject to horticulturists, for the reason that if a plant is to grow up strongly and freely, it must have not only good and abundant food, but a suitable and healthy abode. Science, as well as practice, have demonstrated the fact that some kinds of soil are more suitable than others to certain plants, and it is found that the value of different soils for horticultural purposes is greatly dependent upon the original material from which they were made, and upon the state of fineness to which they have been reduced.

FORMATION OF SOILS.

All soils have been formed by the disintegration of rocks, through the prolonged action of water, air, and frost; and in

the latter stages of their history by the action of vegetable and animal life, and their products. When once a soil has been brought under cultivation, the continual ploughing, digging, hoeing, stirring, and other operations of the gardener—all comprehended under the term “tillage”—assist most powerfully the weathering influences, and cause cultivated soils to become finer and more permeable, and consequently in that respect better and better.

The purposes of tillage are twofold. First, it improves the texture of the soil in the mere mechanical sense; or, in other words, it stirs and loosens the soil so that the roots of plants may readily pass through it. Air and water are allowed to enter freely, and water is enabled to pass easily through the mass, while at the same time it ensures that the soil shall retain a sufficient amount of moisture for plant-life.

Secondly, tillage alters the position and condition of the soil particles, facilitating the chemical changes in these particles through the action of atmospheric agencies. Helping also the microscopic organisms in their work of nitrifying the organic matters contained in the soil.

The weight of soil on an acre of land is so enormous that small proportions of plant-food present in it may amount to very considerable quantities when reckoned up to the acre at any given depth. Table I. illustrates the weight of different descriptions of soil, cut to 9 inches deep, when perfectly dry and free from stones.

TABLE I.—WEIGHT of an ACRE of SOIL, cut to 9 inches deep, Dry and Free from Stones.

						Pounds.
Sandy soil	...	...	...	...	...	3,500,000
Arable loamy soil	...	...	...	...	...	3,000,000
Pasture soil	...	...	...	...	...	2,250,000
Forest soil	...	...	...	...	...	1,500,000
Peaty soil	...	...	...	...	...	1,000,000

These illustrations show that an acre of sandy soil will weigh 3,500,000 lbs.; an ordinary arable loamy soil 3,000,000 lbs.; a pasture soil when dried and the visible roots removed will weigh about 2,250,000 lbs.; a forest soil that contains an abundance of decaying vegetable matter will weigh but 1,500,000 lbs. per acre; while an acre of peaty soil cut to 9 inches deep, in consequence of its light and spongy character,

will weigh only 1,000,000 lbs., or in some cases possibly even less.

THE USES OF SOIL.

The uses of a soil to plants are to provide a firm yet sufficiently deep and porous layer, into which the roots can penetrate, and extend their fibrils and rootlets in every direction. The soil has to support the plant in an upright position, and keep it firm, when in the open air, against the storms of wind and rain. It must allow of the free percolation of both water and air, which are so necessary to the life and growth of the plant, and to the due preparation of plant-food in the soil. It must retain sufficient moisture to furnish the growing crop with an immediate supply of water, and its pores must be sufficiently fine to allow of the ascent of water from the subsoil by capillary attraction. It must store up some of the heat received from the sun in the day-time, and so render the temperature of the soil more equable. It also serves as a protective covering to roots and seeds against excessive summer heat and winter frosts.

A soil should contain in itself a stock of the mineral food necessary to the growth of crops, and it must constitute the laboratory of a number of wonderful actions whereby plant-food is always being prepared little by little for reception and assimilation into the plant. For a soil to be fertile it must permit of the various tillage operations by which alone the surface can be kept free from weeds, and given the proper conditions of texture necessary for the sowing of different seeds, and for the healthy development of the various crops grown upon it.

All fertile soils are made up more or less of each of the following substances:—Gravel, clay, sand, carbonate of lime (chalk), and vegetable matter. Each of these ingredients can be discovered in, and separated from, a soil by simple means. The proportions in which they are mixed together in any given soil have great influence on the uses to which the soil can be put in practical horticulture, and the kind of crops and individual plants best fitted for it to grow.

Table II. gives an illustration of the mechanical analysis of five different descriptions of soil, cut to 9 inches deep. The quantities are quoted in 100 lbs. of each, free from moisture:—

TABLE II.—MECHANICAL ANALYSIS of DIFFERENT DESCRIPTIONS of SOIL, cut to 9 inches deep.

	Arable loamy soil	Rich pasture soil	Alluvial pasture soil	Rich water meadow soil	Heath mould (Ghent)
	%	%	%	%	%
Gravel	8.7	9.2	0.3	1.6	0.0
Sand	62.9	28.1	72.2	51.4	34.0
Clay and chalk	19.9	52.7	20.1	11.1	2.0
Organic matter	8.5	10.0	7.4	35.9	64.0
Total	100.0	100.0	100.0	100.0	100.0

The quantity of gravel is seen to range from less than $\frac{1}{2}$ per cent. to over 9 per cent. The sand ranges from 28 to 72 per cent. The clay, including lime and soluble silica, ranges from 2 per cent. in the Ghent heath mould to about $52\frac{3}{4}$ per cent. in the rich pasture soil. The organic matter ranges from about $7\frac{1}{2}$ per cent. to 64 per cent. The Ghent heath mould is composed of more than five-eighths of its total weight of organic matter. It may, therefore, be easily understood that the ready-formed plant-food in soils, whether of mineral constituents or of nitrogen, is a very fluctuating quantity, often falling below the needs of a particular crop, as regards one or other ingredient. It is only the very rich virgin soils, formed by breaking up of natural pastures of newly settled countries, or such soils as the Ghent heath mould, as quoted in Tables II. and III., that are practically inexhaustible.

THE SOIL AS A SOURCE OF PLANT FOOD.

In order to start with definite notions about the inherent fertility of soils, I may state that where any plant, however lowly, has once grown and died away, its remains gradually decay and add a little vegetable or organic matter to the soil, rendering it thereby capable of growing a better plant the next season. As the soil becomes richer in carbonaceous and vegetable matters, higher organised plants will occupy it; these pass through the same phases of life as the plants of simpler structure, and enrich the soil at an increasing rate by the expanded flora, as well as by the greater bulk of their products.

that fall victims to organic law. We have to remember, further, that the greater part of the weight of every plant is obtained from the air, and only a very little is derived from the soil. Not only so, but it is a fact, and a very important one, that new plants grow much more quickly than the remains of the old ones decay and disappear; hence organic carbonaceous matter must always be increasing in a soil left in a state of nature and uncultivated.

The character and amount of plant-growth is found to differ considerably in different soils, and the largest quantity of produce will be grown on the soils where the wild plants could get the greatest amount of food. It happens, therefore, that the virgin soils, as they are termed, derived from the heath, the forest, or the prairie, which are first ploughed up by the settlers in new countries, are richly charged with a blackish-brown vegetable substance, known under the general name of humus, and recognised as one of the marks of a fertile soil. In fact, humus was considered by agricultural chemists in the early part of the present century to be the main source of soil fertility.

But without supposing that plants feed directly upon humic matter, it is easy to see why the proportion of this substance is often a very fair measure of the productiveness of a soil, for the reason that it represents the material accumulated by a previous succession of crops.

Table III. shows the proportion of organic matter, and of nitrogen in the organic matter, in seven descriptions of soil, in quantities per acre, the soil being cut to 9 inches deep.

TABLE III.—ORGANIC MATTER and NITROGEN in DIFFERENT DESCRIPTIONS of SOIL per acre, cut to 9 inches deep.

Description of soil	Organic matter	Nitrogen
	lbs.	lbs.
Arable loamy soil	34,500	3,360
Pasture soil	76,050	5,558
Prairie soil	117,225	9,680
Forest mould	126,900	6,750
Leaf mould	141,950	8,805
Peat mould	188,000	5,000
Heath mould (Ghent) . .	640,000	11,650

The figures show a very considerable range in the amount of

organic matter in the different soils, according to the locality from which they have been obtained. Thus an arable loamy soil that is under constant cultivation of an ordinary rotation of crops contains 34,500 lbs. of organic matter per acre with 3,360 lbs. of nitrogen. As all arable land was once pasture or forest, the loss of organic matter and of nitrogen that has occurred during its cultivation becomes obvious when we compare these figures with those that follow in Table III. A pasture soil with its undisturbed accumulation of root-fibres contains 76,050 lbs. of organic matter per acre, a quantity more than double that of the arable soil; and 5,558 lbs. of nitrogen, or nearly one ton per acre of nitrogenous plant-food in excess of the arable soil. The prairie soil, which has doubtless been gathering and storing up organic matter for many centuries, is seen to contain 117,225 lbs. per acre of this substance, with a correspondingly large quantity of nitrogen, amounting to 9,680 lbs. or to more than four tons per acre. The forest mould contains even more organic matter than the prairie soil, but, owing probably to the woody nature of the refuse, the decaying material is much less rich in nitrogen than the more fibrous-rooted soil of the prairie. The leaf-mould and the peat-mould contain, as would be expected, an enormous amount of organic matter, averaging, when cut to 9 inches deep, more than seventy tons per acre. The proportion of nitrogen, which is lower than in some of the other soils, depends in such moulds upon the degree of oxidation or decomposition to which they have been submitted. The oxidation of the organic matter in a peat-bog may be greatly checked by a high-water level, which excludes air from the soil; hence an unlimited accumulation of organic matter may take place if plants capable of growing under these circumstances are present.

A dark-coloured soil becomes hotter in the sun's rays than a light-coloured one, hence the oxidation and nitrification of the organic matter is more active in these richer soils, provided the requisite mineral ingredients are not deficient.

The last item in Table III. relates to a vegetable mould existing in Belgium and known in the horticultural trade as "Ghent heath mould"; it is the result of the decomposition of various species of *Erica* mixed with sand, and is most extensively used in the cultivation of azaleas for market.

The analysis of the soil shows that it contains the vast quantity of 640,000 lbs. per acre of organic matter when cut to 9 inches deep, and gives 11,650 lbs. of nitrogen per acre. Such fibrous-rooted soils as the Ghent heath mould are of a light texture, and peculiarly suited to the growth of most greenhouse and conservatory plants. Their peculiar property is that they facilitate drainage and aëration, causing a quick and active growth with a free development of feeding roots; and thus are especially fitted for composting with other and stiffer descriptions of soils.

The soil, then, as it results by the processes thus briefly indicated is a compound of coarse and fine materials, mixed with clay, silica, and chalk; together with a greater or smaller amount of organic matter, holding a variable but usually large quantity of moisture.

Further, a soil rich in organic humus matter is rich in nitrogen; while a soil poor in organic substance is poor also in nitrogenous plant-food; and the permanent fertility of a soil is found to be very closely connected with its power of retaining plant-food.

Table IV. illustrates the percentage amount of five selected constituents—organic matter, nitrogen, potash, lime, and phosphoric acid—in seven widely different descriptions of soil. The quantities quoted are in water-free soils.

TABLE IV.—SELECTED CHEMICAL CONSTITUENTS IN DIFFERENT DESCRIPTIONS OF SOIL. Quantities in 100 pounds of each, dry.

	Ordinary average loam	Garden bedding loam	Rich garden loam	Rich pasture soil	Leaf mould	Peat mould (France)	Heath mould (Ghent)
	%	%	%	%	%	%	%
Organic matter	3·84	4·05	8·46	14·55	17·00	18·80	64·00
Nitrogen . .	0·13	0·23	0·45	0·59	0·47	1·40	1·17
Potash . . .	0·20	0·33	0·73	0·75	0·50	0·31	0·14
Lime	0·66	0·67	2·08	1·20	0·18	0·53	0·35
Phosphoric acid	0·12	0·48	0·10	1·00	0·13	0·20	0·16

The analytical results show that the proportion of plant-food present in soils is very small, even when the land is extremely fertile, the bulk of the soil serving chiefly as a support to the growing crops and as a sponge to hold water for their use.

An ordinary average sample of loam is seen to contain 3·84 per cent. of organic matter, 0·13 per cent. of nitrogen, 0·20 per cent. of potash, 0·66 per cent. of lime, and 0·12 per cent. of phosphoric acid. A garden bedding soil of fair texture will contain a larger proportion of available nitrogen, as well as other plant-food constituents, than the ordinary arable loam; the amount of nitrogen being nearly double, the potash considerably larger, and the phosphoric acid four times as much. The rich garden loam is about twice as valuable in the various chemical ingredients as the garden bedding mould; the exceedingly large amount of lime—over 2 per cent.—would very materially assist in the active nitrification of the larger percentage of organic matter, which is shown to be nearly $8\frac{1}{2}$ per cent. In fact, Professor Hilgard has pointed out that the presence of lime in a soil, especially when associated with humus, much increases the availability both of potash and of phosphoric acid, so that smaller quantities of these constituents suffice when extra lime is present.

The rich pasture soil, in consequence of its extensive amount of grass-root fibres, contains in the sample quoted $14\frac{1}{2}$ per cent. of organic matter, with 0·59 per cent. of nitrogen, about the same amount of potash as the garden loam, but only one-half the proportion of lime. The phosphoric acid, however, is exceedingly high, amounting to 1 per cent., being the richest in the series.

The leaf mould contains 17 per cent. of organic matter, with nearly $\frac{1}{2}$ per cent. of nitrogen, a good quantity of potash, but only small amounts of lime and phosphoric acid.

The peat mould of France is high in most constituents, especially in organic matter, and in nitrogen; the potash and phosphoric acid are, however, somewhat low in amount.

The Ghent heath mould is remarkable for its enormous quantity of organic matter. Much of this is stated to be in not a very advanced stage of decomposition. Consequently the quantity of fine mould passing through a $\frac{1}{4}$ in. mesh sieve is found to be less than in the case of some other soils. These investigations show that the great value of the Ghent heath mould and of the French peat mould for horticultural purposes rests mainly in the excessive amount of fibrous-rooted material or of leafy organic matter, with a correspondingly large amount of nitrogen. It is these constituents which by their abundance

produce the greatest fertility, and the practical value of the results is the fact that, knowing the substances directly assimilable by plants and the character of the soil to be cultivated, the horticulturist may, by means of applying the elements that are wanting, obtain the conditions best suited to his particular cultures.

JADOO FIBRE.

Most horticulturists have heard of "Jadoo fibre," and although it is not a soil, yet, as it is recommended to take the place of mould in gardening practice, I have thought it desirable to bring the subject before you.

We have seen that the surface soil of a prairie, a forest, or a permanent pasture is exceedingly rich in organic matter, and that the inherent fertility of the soil may be very accurately gauged by estimating the amount of such organic matter, and of the quantity of nitrogen contained in it. It is the surface soil of a very rich prairie that the Jadoo fibre most nearly resembles.

Colonel Halford Thompson, the inventor of the Jadoo process, says the material consists of peat-moss, to which soot, bone-meal, and gypsum, with a small quantity of phosphoric acid and potash, have been added. These ingredients are boiled together, and undergo a process which Col. Thompson calls "fermentation," and he says that the whole essence of the success of Jadoo fibre for plant-culture lies in the amalgamation by this "fermentation" of the various plant-food ingredients.

When Colonel Thompson understood that I was preparing the present Lecture he very kindly supplied me with a quantity of the fibre for analysis and experiment. Table V. shows the composition by a partial analysis of the substance.

TABLE V.—JADOO FIBRE. Its Chemical Composition.

Organic matter (water-free)	.	.	.	.	21.75 per cent.
Moisture	.	.	.	.	78.25 "
Total					100.000 "
				In fresh	In dry
				Per cent.	Per cent.
Mineral matter (ash)	.	.	.	2.70	12.41
Nitrogen	.	.	.	0.27	0.96

These results show that Jadoo fibre contains $21\frac{3}{4}$ per cent. of organic matter, with $78\frac{1}{4}$ per cent. of moisture. The mineral

matter (ash) was found to be 2·7 per cent. in the fresh substance, and nearly $12\frac{1}{2}$ per cent. in the material when fully dried. The nitrogen is shown to be about $\frac{1}{4}$ per cent. in the fresh fibre, and nearly 1 per cent. in the fully dried substance. The Jadoo fibre is, therefore, richer in organic matter and in nitrogen than the famous leaf-moulds of Rambouillet and Maurepas, France, so largely used in the horticultural establishments of that country. But while it does not contain so much organic matter or nitrogen as the Ghent heath mould, it is richer in mineral constituents. The chemical composition thus given pretty clearly shows that the reason of the great value of Jadoo fibre rests in the fact that the organic nitrogen is readily susceptible of nitrification, and so of becoming easily available to vegetation.

NITRATES IN THE SOIL.

As soil fertility is of so much importance to the horticulturist in the productiveness of the garden, and as the final returns may be expected to be directly proportionate to the amount of nitrates which it contains, and to the facilities or favourable conditions offered for the conversion of organic nitrogen into ammonia and nitrates, the subject of nitrification in the soil becomes one of intense interest.

Nitric acid is a compound of nitrogen which represents the form of combination in which nitrogen must be in order that plants may use it as food. The organic nitrogen of the soil, as well as that contained in such fertilising materials as leaf mould, peat mould, stable and farmyard manure, blood, fish, rape cake, vegetable and animal refuse, &c., is not in a condition to serve as plant-food. To become available it must be converted into ammonia and then into nitric acid. This change is accomplished by certain living organisms, known as bacteria, which exist in all fertile soils—the carbon of the humus being at the same time oxidised to carbonic acid, whereby heat is developed. The different stages of the work are apparently performed by different species of bacteria.

We are told by Professor Warington that the final nitrification of ammonia, which is a product of oxidation or decay, is performed by two species of bacteria, one of which produces nitrites, which the other changes into nitrates, the latter being the form in which plants take up most of their nitrogenous food.

One essential condition of the nitrification of organic matter is that it only takes place in a moist soil, sufficiently porous to admit air; hence the beneficial effect of mixing a certain proportion of sand, charcoal, or peat to soil composts for potting purposes, and the value of a sufficiency of crocks for drainage. It is also necessary that some chemical base should be present in the soil, with which the nitrates as they are formed can combine; this condition is usually fulfilled by the presence of carbonate of lime (chalk), nitrate of lime being produced. In leaf moulds and peat moulds rich in humus the nitrification is sometimes rendered difficult by the lack of such a constituent, the alkali bases rendered soluble by nitrification get rapidly used up, and the soils in consequence become overcharged with acidity, to the injury of the growing plants. It is necessary in such cases to apply an antidote, which may be lime, chalk, or wood ashes; these substances tend to accelerate the nitrification in an extraordinary manner.]

Temperature is another prime factor in determining the rate of oxidation and nitrification in organic materials and soils; the activity of all living agents, whether animal or vegetable, being dependent on the occurrence of a favourable degree of heat, and being confined to certain specific ranges of temperature. Oxidation is consequently found to be far more rapid in summer than in winter, and much more energetic in hot climates than in cold; accordingly we find it more active in a conservatory than in the open garden.

The nitrifying organisms in soils may be killed by severe drought. This may probably explain the fact of some plants suffering so terribly from insufficient watering at certain stages of their growth. For instance, the chrysanthemum never thoroughly recovers the ill-effects of excessive drought.

Recent investigations have shown that the microderms are in greater or less numbers in all fertile soils, but are most active in soils under cultivation, teaching us the advantage of the frequent use of the hand-hoe and other implements of tillage in the open garden, and of a friable porous soil for potting purposes. The soil should have good capillary action, so that at all seasons it will as near as possible contain that amount of moisture which is present when ground digs well, because this is found to be the degree of moisture most desirable. Soils should also contain

plenty of organic matter to furnish nitrogenous plant-food and to favourably influence the supply of water. It is for this reason that horticulturists find leaf-mould, pasture-turf soils, and peat soils so beneficial for plant-growing.

The total quantity of nitrates found in fertile soils is very considerable. Table VI. shows the amount of nitrogen as nitrates in drainage water passing through an unmanured soil and a recently dunged soil. The quantities are given in pounds per acre during each of the seasons of spring, summer, autumn, and winter; also the total amount for the whole year.

TABLE VI.—NITROGEN AS NITRATES IN DRAINAGE WATER.
Quantities in pounds per acre.

Seasons						Unmanured soil	Dunged soil
						lbs.	lbs.
Spring	.	.	.	.	.	19.5	46.1
Summer	.	.	.	.	.	13.5	22.2
Autumn	.	.	.	.	.	28.3	38.2
Winter	.	.	.	.	.	13.5	17.4
Yearly total						74.8	123.9

The figures show that in the unmanured soil nearly 75 lbs. of nitrates were produced in the year, whilst in the dunged soil about 124 lbs. were produced in the year. In the unmanured soil the largest production of nitrates was in the autumn, while in the dunged soil the maximum amount was formed in the spring. But it may be well to note that the whole of this nitrogen would not be available to our ordinary cultivated crops, for the reason that many of them only assimilate the spring or early summer nitrates, the principal growth and power of assimilation having ceased by the month of July.

Vegetable crops, such as cabbage, beet, onions, turnips, carrots, parsnips, celery, peas, &c., may still get hold of summer-formed nitrates, but that produced late in autumn and winter is of little use in so far as this applies to outdoor plants.

The spring nitrification of the soil is, as a rule, quite insufficient to meet the food requirements of early-sown spring crops; hence the advisability of using some stimulating manure,

such as nitrate of soda, guano, ammonia salts, or soot if very early production of vegetables is desired.

The change of insoluble into soluble plant-food is always going on in the surface soil, especially in rich moulds, and as the nitrates are formed they are at once taken up by the growing plants; but if there is no plant at hand, then the soluble constituents are washed away by the rains, and thus a constant exhaustion of plant-food in soils that are uncropped is being brought about.

In rich garden soils the production of available plant-food is at its maximum, and so is also the waste by drainage if proper care be not taken.

AVAILABLE PLANT-FOOD.

A large part of the elements of plant-food contained in soils is present in such a condition that plants are unable to make use of it. For example, it is very usual to find about 0.15 per cent. of phosphoric acid in an ordinary loamy soil. Such a soil 9 inches deep, in its dry state, may be said to weigh from 1,200 to 1,500 tons per acre. A soil containing 0.15 per cent. of phosphoric acid would accordingly contain somewhere about two tons of phosphoric acid to the acre, disregarding the subsoil altogether. Such a soil contains as much phosphoric acid per acre as would be contained in about seventeen tons of superphosphate or in nearly ten tons of bone dust, and yet the addition of a few hundredweights per acre of phosphatic manure may make the difference between a full crop and a bad one. Similar statements would apply to other constituents of the soil. This leads us to recognise the important fact that it is not the total proportion of phosphoric acid, or of potash, or of nitrogen that rules a soil's fertility for horticultural purposes, but the amount of each of them that is present in an immediately available condition.

This question of the availability of plant-food in soils has been dealt with more or less fully during recent years by many investigators, and to Dr. Bernard Dyer we owe much valuable information regarding the subject. By the permission of Sir John Lawes, and with the advice and personal assistance of Sir Henry Gilbert, Dr. Dyer obtained samples of soils from an experimental field at Rothamsted, Hertfordshire, which has grown

barley for forty-six years in succession, from 1852 to 1897 inclusive, and on which each plot has been year after year subjected to some one kind of manurial treatment. Thus were obtained soils about whose history and whose fertility very exact information was attainable. The soils were submitted to analysis by using a solvent consisting of a 1 per cent. citric acid solution. Such a solution is found to yield instructive information in the case of manures, and it approximates fairly closely to the average acidity of plant-root sap. These samples of soil were taken in the autumn of 1889, after thirty-eight crops of barley had been removed. Table VII. (a) gives a list of nine plots out of a total of twenty-two submitted to analysis, with the description of manure applied to each.

TABLE VII. (a).—ROTHAMSTED EXPERIMENTS.

Particulars of Manures applied for the Growth of Barley, for 38 years in succession: 1852-89.

Plot Nos.	Manures applied every year
1, O	No manure
2, O	Superphosphate alone
3, O	Potash, soda, and magnesia (no phosphates)
4, O	Superphosphate, potash, soda, and magnesia
1, A	Ammonium salts alone
2, A	Ditto, and superphosphate
3, A	Ditto, and potash, soda, and magnesia (no phosphates)
4, A	Ditto, and superphosphate, potash, soda, and magnesia.
7-2	Farmyard manure

This table shows that plot 1 O received no manure; plots 2 O, 3 O, and 4 O received different mineral manures; plot 1 A received ammonium salts alone; plots 2 A, 3 A, and 4 A received a similar quantity of ammonium salts with various mineral manures in addition; and plot 7-2 received farmyard manure at the rate of 14 tons per acre every year.

The next table—VII. (b)—belongs to the same experiments, and shows the total amount per acre in the top 9 inches of soil of potash and phosphoric acid present in each plot of land, with the quantity that was found soluble in a 1 per cent. solution of citric acid; also the average produce per acre of barley grain and barley straw that was grown on each plot.

TABLE VII. (b).—ROTHAMSTED EXPERIMENTS.

On the Growth of Barley for 38 years. Amount of Potash and Phosphoric Acid in the Soil, and the quantity soluble. Also produce per acre.

Plots	Potash	Soluble in 1 per cent. Citric Acid	Phosphoric Acid	Soluble in 1 per cent. Citric Acid	Produce per acre	
					Grain	Straw
Quantities per acre, first 9 inches of soil.						
	lbs.	lbs.	lbs.	lbs.	Bushels	Cwts.
1, O	36,604	91	2,503	139	16 $\frac{1}{2}$	9 $\frac{3}{8}$
2, O	37,918	165	4,601	1,170	21 $\frac{3}{4}$	10 $\frac{3}{4}$
3, O	42,848	925	3,059	253	18	9 $\frac{1}{2}$
4, O	43,429	859	4,778	1,360	22 $\frac{3}{8}$	11 $\frac{3}{8}$
1, A	35,845	50	2,452	152	29	16
2, A	36,376	57	4,373	1,073	42 $\frac{3}{4}$	23 $\frac{7}{8}$
3, A	39,637	1,029	2,579	205	31 $\frac{3}{8}$	18
4, A	43,301	753	4,602	1,264	43 $\frac{1}{2}$	25 $\frac{1}{8}$
7-2	33,374	669	3,669	932	48 $\frac{5}{8}$	29

The results show at a glance the comparative exhaustion or accumulation of both potash and phosphoric acid. It will be seen that plot 1 O, to which no manure of any kind had been added for thirty-eight years, contained 36,604 lbs. of potash per acre, of which only 91 lbs. was soluble, or available to plants. Of phosphoric acid there was 2,503 lbs., of which only 139 lbs. was soluble. With this small quantity of available plant-food per acre it is not surprising that an average produce of 16 $\frac{1}{2}$ bushels of barley grain, and 9 $\frac{3}{8}$ cwts. of straw only was obtained. In fact, the wonder is that the land continued to grow corn at all.

The three other plots of the O series show from 37,918 lbs. to 43,429 lbs. of potash per acre, of which there is a range in the solubility of from 165 lbs. to 925 lbs. per acre. The amount of phosphoric acid ranges from 3,059 lbs. to 4,778 lbs. per acre, and the soluble portion from 253 lbs. to 1,360 lbs. per acre; the two plots (2 O and 4 O) receiving the phosphate manure each year show from five to six times more available phosphoric acid than plot 3 O, which had never received phosphate as manure.

The difference between 36,604 lbs. and 43,429 lbs. of total

potash in the soil, and of 2,503 lbs. and 4,778 lbs. per acre of total phosphoric acid, appears from these results to be immaterial as a measure of present soil fertility, notwithstanding that the degree of solubility of each constituent is largely increased on the different plots according to the manure employed. As no nitrogen has ever been applied to the plots of the mineral series (1 to 40) there has been no strain on the natural resources of the soil, and consequently the barley crops obtained have been small.

From the next group of plots, 1 A to 4 A, we get some valuable information. To each of these portions of ground ammonium salts have been added to the other manures. (*See Table VII. [a].*) The total amount of potash is seen to range from 35,845 lbs. to 43,801 lbs. per acre; of this quantity the soluble part ranges from 50 lbs. to 1,029 lbs., showing that plot 3 A has 200 times more available potash than plot 1 A, but, owing to the lack of sufficient soluble phosphoric acid, the yield of barley is but 2 bushels per acre in excess of plot 1 A. The phosphoric acid ranges in total amount from 2,452 lbs. to 4,602 lbs. per acre, the soluble portion from 152 lbs. to 1,264 lbs. per acre. The produce of barley grain and of barley straw is seen to be about doubled from the previous series; but in plot 1 A, receiving ammonium salts alone, there is a starvation of the two mineral constituents, potash and phosphoric acid, notwithstanding the large amounts in the soil; while in plot 3 A, receiving the nitrogen and potash, but no phosphates, there is a starvation of phosphoric acid, with a consequent falling-off in the crop grown.

Plot 7, which had received 14 tons of farmyard manure per acre for thirty-eight years, amounting to the enormous quantity of 532 tons of manurial material, but made up very largely of organic matter and water, shows an accumulation in the soil of 33,374 lbs. of potash per acre, of which 669 lbs. only is soluble. Phosphoric acid shows 3,669 lbs. per acre, of which 932 lbs. are soluble. The returns of corn and straw on plot 7 show that the accumulated residue of organic nitrogen in the soil enables the crop to be maintained at a high standard, notwithstanding that the amounts of potash and phosphoric acid in the top 9 inches of soil are lower than in the soils receiving artificial manures. But doubtless the improved subsoil on the dunged plot would have much to do with its increased produce.

HOW PLANTS ARE DEPENDENT UPON THE FOOD SUPPLY IN THE SOIL.

The invaluable investigations of Rothamsted just referred to, and others of a similar kind, illustrate this fact among others—that the crop or particular plant we grow has to do not only with the supply of food in the soil as a whole, but also with each of its ingredients separately. The total productive power of a soil cannot exceed its power to supply to the growing plant each and all the necessary food constituents. Every plant we cultivate must have a certain amount of each of the nutritive elements—potash, phosphoric acid, and nitrogen—or it cannot grow satisfactorily. Thus the plant cannot rise above the level of the lowest ingredient in the food supply. If each description of food comes up to the required standard, and other conditions of heat and moisture are favourable, a good result may be expected; but if any one element falls below this standard, the growth of the crop must suffer.

We have seen in the various illustrations brought forward that the food supply available to plants varies greatly in different soils. Sometimes one constituent and sometimes several may be lacking. An horticultural soil may have a proper texture, with a suitable amount of moisture, and, in fact, a full supply of everything the plant needs, except phosphoric acid; if so, it cannot yield a full crop. Add phosphate in an available form and the growing plants will be benefited. Another soil may be deficient in potash, another in lime, another in nitrogen, still another in two or three of these substances. This same variation, as shown in Table VII. (*b*), may run through inherent fertility of the soil and in the solubility of its constituents. Therefore an horticultural soil may be deficient in available mineral ingredients or in available nitrogen. Or it may be so compact that air and moisture cannot get into it to work over the crude material it contains, nor the plant roots make their way through to obtain the food that has been made soluble. Again, it may be so loose and non-retentive that the food constituents will escape by drainage. Or, on the other hand, it may be so dry that fertilisers will be useless, and plants wither for lack of moisture; or so wet and cold as to prevent plant growth. In these several cases proper tillage operations will assist in amending the

soil texture. Its power of holding water may be improved; its supply of available plant food increased; and then by a suitable manurial treatment it may be brought into condition to yield bountiful returns for all that is done to it.

The next question very naturally is, What ingredients of plant-food are most frequently deficient in horticultural soils?

I think we may take it as a pretty-well established fact that the only constituents of plant food which need be supplied to garden soils are potash, phosphoric acid, lime, and nitrogen. When we say these ingredients are lacking, we do not mean that the soil does not contain them, but that it does not supply the growing plants with as much as they need. It is not so much because horticultural soils have been worn out of plant food, but rather because the food is locked up in such combinations that the roots cannot get at and use it, that an artificial supply of soluble food in manure becomes necessary.

CONCLUSION.

In conclusion, a few practical remarks may be made upon the three main constituents of plant food in horticultural soils—namely, nitrogen, potash, and phosphoric acid.

Nitrogen.—Although the nitrification in rich garden soils, leaf-moulds, and peat-moulds may be sufficiently active for the gardener to dispense with artificial nitrogenous manures in most cases, yet there are certain species of plants which rapidly develop a large mass of foliage, and these cause a rapid and extensive demand upon the available nitrogen of the soil. For such plants it will always be advisable to use nitrate of soda, sulphate of ammonia, guano, soot, or similar materials as manure; and also for growing very early crops, or plants *out of season*.

Phosphoric Acid.—Assimilable phosphoric acid occurs in very small actual quantities in most soils, however rich; this has been fully illustrated in the tables. It is therefore necessary to add this ingredient by a manurial application if full crops are to be obtained. The best form in which phosphoric acid may be added to horticultural soils is by bone phosphate, bone meal, double superphosphate, or basic slag. Superphosphate of lime yields a certain proportion of phosphoric acid soluble in water. But in rich moulds cheap mineral superphosphates are not to be

recommended, being always more or less acid; and this introduction of sulphuric acid into soils poor in lime would certainly be hurtful to growing plants.

Potash.—Rich horticultural soils contain a considerable proportion of potash, which becomes only slowly available for vegetation. For certain cultures—more especially that of ferns, palms, vines, roses, potatoes, &c.—potash manures have a very beneficial effect when applied to leaf-mould composts. The most rational mode of application is to use carbonate of potash, one of the chief ingredients in wood ashes; kainit salt, sulphate of potash, or muriate of potash may also be used. Potash is retained by the soil, and plants are able to absorb it as they need. The proportion to be used must vary according to the requirements of the plants cultivated.

ON THE FLORA OF AUSTRALIA.

By G. H. ADcock, F.L.S., F.R.H.S.

I HAVE often tried to imagine what must have been the feelings of Mr. (after Sir Joseph) Banks and his companion, Dr. Solander, as they—the first scientific investigators of living Australian plants—gazed on the enchanting beauty and rich floral profusion which aptly suggested the name “Botany Bay.” Fancy an enthusiastic botanist in the present day finding himself in a new land with a flora so unlike that of any other.

In attempting even a sketch of our splendid flora at the request of the ever-courteous Secretary of the Royal Horticultural Society, it is with the consciousness that the subject requires an abler pen than mine to do it anything like the justice to which it is entitled.

In the “Second Systematic Census of Australian Plants,” published in 1889, my esteemed friend the late Baron von Mueller included among the Vasculares 8,839 indigenous species. Of these he gives 7,501 as endemic to continental Australia and Tasmania; so that in round numbers 85 per cent. of our plants are exclusively Australian. The area is, roughly speaking, about 3,000,000 square miles, much of it presenting almost insuperable

difficulties to the work of collecting. All zones of plant life are here represented, from the Alpine vegetation to the luxuriant and varied flora of the tropics; and it is a record of which we who have made Australia our adopted home may be reasonably proud that so many species, totally different in so many respects from those included in other and better-known floras, have been so closely observed and so carefully and accurately described. When we consider that there are countries—each with a history going back far beyond the commencement of the Christian era, each the birthplace of generations of eminent scientific men—that have never yet had their floras described as systematically as ours, we cannot but feel the deepest admiration for the scientific genius, perseverance, and research by means of which such splendid results have been achieved. Australian botanical science presents an illustrious roll of indefatigable workers.

It is a matter of great regret that so many of the names bestowed on native plants and animals by the pioneer settlers are singularly inappropriate. Thus "Gum-tree" is the colonial name for all species of Eucalypts. The Banksias are known as "Honeysuckles." Our native "Fuchsia" is a *Correa* belonging to the *Rutaceæ*. *Exocarpus cupressiformis* is the native "Cherry." "She Oak" is the name given to some of the *Casuarinas*, whose cone-like fruits are called "Oak-apples." Australian "Tea-trees" are members of the order *Myrtaceæ*, and include plants belonging to the genera *Melaleuca* and *Leptospermum*, while "Native Hops" represent various species of *Dodonæa* and *Goodenia*, or maybe *Davissia latifolia*. And so this list might be almost indefinitely extended.

The flora of Australia presents many peculiarities, of which much capital has often been made. Thus our trees are, many of them, peculiar in giving but little shade. Some are leafless. Our Cherry is stated to grow its stone outside the fruit—really on a succulent fruit stalk—while our Pear (*Xylomelum pyriforme*), one of the Proteads, is not only wooden but reversed on its stalk, and our Nettle assumes the proportions of a fair-sized tree up to 100 feet in height, and so we might go on.

The first thing that will probably strike a botanical observer in Australia is the great extent and wide distribution of its forests, composed chiefly of Eucalypts, which form the principal timber vegetation of the continent with perhaps the exception

of some limited areas in the north and north-east. Of these remarkable trees we have over 150 distinct species. It is remarkable that none of them are indigenous to the romantic and adjacent islands of New Zealand, nor, indeed, are any of our larger trees also native there. Hence the Eucalypts are typical Australian trees, and like many others in our flora are relics probably of the Eocene age.

In this brief sketch no more than a passing mention can be made of the many species deserving much closer attention for their utilitarian or horticultural value. Individuals of some species grow to be gigantic trees. *Eucalyptus amygdalina* is said to equal if not to surpass in height any other tree in the world, not excepting *Sequoia* (*Wellingtonia*) *gigantea*. The latter, however, much exceeds the Eucalypt in the size of its massive trunk. While we must admit that the heights of Eucalypts have been frequently much exaggerated by travellers who have trusted to their imagination rather than to scientific observation, yet reliable measurements have been taken by authentic observers of great heights up to and even considerably exceeding 400 feet. The Western Australian Karri (*E. diversicolor*) is another species remarkable for its towering height. But while some are noted for their lofty growth and stately habit, especially in humid forest glens, yet many species are gnarled and dwarf and almost shrubby. The Eucalypts are locally and popularly known under an almost endless variety of names, *e.g.* blue, white, red, and spotted gum, stringy or iron-bark, peppermint, apple-scented, or manna gum, and mallee. It should be remarked that the same popular name sometimes represents a totally different species in a different locality. Bushmen and splitters tell the varieties by the appearance of the bark, which in some cases is shed in long strips, while in others it is persistent, and may be stringy and soft, or hard and rugged, or furrowed.

The leaves of some varieties grow to a large size, and are liberally provided with stomata. The majority of species produce leaves tough in texture, full of oil glands, and are suspended on their petioles, so that the edges are vertical—these provisions being doubtless Nature's devices to protect the blade of the leaf from the scorching Australian sun.

As aids in the classification of these interesting plants we

may cite the character of the bark as already referred to, the presence or absence of sterile stamens, the arrangement, structure, and dehiscence of anthers, peculiarities of fruit, sections of petioles, and uniformity or otherwise of the number of stomata on the upper and under surfaces of the leaf.

The "Blue-gum" (*E. globulus*) is a lofty tree, remarkable for the quickness of its growth. In some parts of Europe it is popularly called the "Fever-tree" on account of its value in malarial regions. It rapidly absorbs the excessive moisture in marshy places, and freely exhales its valuable antiseptic oil. Its timber is of a very durable character, and as it is of exceptionally rapid growth it has been largely planted abroad. It owes its popular name to the bluish tinge of the waxy bloom that covers the calyces and the foliage of young plants.

The "Red-gum" (*E. rostrata*) prefers low-lying situations, and may usually be seen near the watercourses in almost every part of the continent. It takes its vernacular name from the colour of the timber, which for its durability in such places as are usually favourable to the rapid decay of timbers has probably only one rival in the Jarrah (*E. marginata*) of Western Australia.

The gem of the genus from a horticultural standpoint is unquestionably *E. ficifolia*. Its strikingly handsome dark green foliage, to which it owes its specific name, forms a fitting contrast to the gorgeous crimson flowers which this magnificent species bears in such profusion. Other brilliantly coloured species are *E. miniata* and *E. Phœnicea*, both of which yield flowers of a bright scarlet colour.

The "Sugar-gum" (*E. corynocalyx*) produces sweetish foliage, which affords food for stock in seasons of drought.

Time and space would fail even to refer to the many other meritorious species. In addition to the useful timber, many yield large quantities of the Eucalyptus oil, which is largely and increasingly used in medical practice. The result of a series of elaborate experiments seems to prove that *E. amygdalina* is far richer in oil than any other species. The Eucalypts claimed our first attention owing to their wide distribution and the immense areas they cover, as well as for their towering height, their economic value, and, in some cases at least, for the unsurpassed beauty of their blossoms. However,

in point of numbers the Leguminosæ come far ahead, and represent about 12 per cent. of the flora.

The Acacias, numbering some 300 odd species, make up by far the largest Australian genus. The golden and delicately fragrant blossoms of many of these species are amongst the first to proclaim the advent of spring. They are represented almost everywhere in the continent. Some line the banks, and the graceful pendulous branches of some varieties droop over the waters of many of our inland streams. They clothe the mountain-side, adorn the pastures, grow in the poorest or in the most fertile soil, while some species revel in sandy tracts either inland or littoral. In some of our dense southern forests they form a large proportion of the undergrowth. Even in the arid and desolate interior they are represented, and form in some cases an almost impenetrable scrub that well-nigh baffles the hardy and daring explorer in his toilsome advance through those dreary and inhospitable solitudes. From this circumstance some have earned the names of "deadfinish" and "wait-a-while." These local names have been doubtless bestowed on them by travellers who have experienced a disappointing repulse in their onward march by an impassable barrier of the dense growth. Strictly speaking many species have no true leaves, but are amply provided with phyllodia.

Acacias are not without utilitarian value. Several yield a bark exceedingly rich in tannin, e.g. *A. decurrens*, *A. mollissima*, while the "Golden Wattle" (*A. pycnantha*), besides being so attractive to the senses of sight and smell, yields one of the richest barks for tanning purposes in the world. The gum, which is very copiously exuded by several kinds, is used for the same purposes as Gum Arabic. The delicate perfume of the blossoms has been extracted, and furnishes an agreeable scent. Several species, as *A. pravissima*, *A. cultriformis*, and others, possess considerable horticultural merit, and are extensively planted.

The timber of the "Blackwood" or "Lightwood" (*A. melanoxylon*) is one of our most valuable, and is used in cabinet work, railway-carriage fittings, and for similar purposes. *A. acuminata* produces wood whose scent resembles that of raspberries, while the timber of *A. homalophylla* is violet-scented. Both these species are known as "Myall."

The parts of the flowers that are conspicuous in our Eucalypts and Acacias are the parts that are more or less concealed in many of our cultivated blossoms. Included in the same order is a gigantic bean (*Entada scandens*) whose pods are sometimes 6 ft. to 8 ft. in length. The individual seeds are often hollowed, mounted with silver, and converted into fancy match-boxes. Very many of the papilionaceous section of the Leguminosæ produce handsome flowers, such as *Indigofera*, *Dillwynias*, *Pultenæas*, and *Swainsonias*. Many of the latter are remarkable for spiral or curved lower petals and beautiful blossoms, but are frequently deleterious. Besides these there are others equally attractive in almost endless variety. But probably none are more charming than *Clianthus Dampieri*, Sturt's Desert Pea, whose silver-green foliage and large, bright, gorgeous blossoms render it peculiarly conspicuous and attractive.

Next in importance, when we consider the number of species, are the Proteads, than which, perhaps, no order of indigenous plants has greater interest either for the gardener or the botanist. The name bestowed on this order (from the South African *Protea* of Linnæus) is singularly appropriate, for these plants exhibit a variability which excels even the mutable characteristic for which the mythical sea-god was so remarkable. Probably the commonest and most widely distributed Proteads are the native Honeysuckles (*Banksia spp.*). They owe their singular popular name probably to the fact that they, in common with many other proteaceous plants, yield a copious supply of nectar. While the aborigines greedily suck the flowers to obtain this sweet fluid, yet with Europeans its use is frequently attended with feelings of nausea and headache. *Dryandra plumosa* is often cultivated for the sake of its large cylindrical flower-clusters and its deeply serrated and peculiar foliage. Both flowers and foliage of this unique plant will keep almost indefinitely. Of Grevilleas there are probably over 160 varieties, but as yet only about half-a-dozen species are in cultivation. These include the stately *G. robusta*, or Silky Oak, as it is popularly called. Its immense comb-shaped trusses of bright orange flowers render the tree a strikingly conspicuous object in the landscape. These blossoms have sometimes been fancifully compared to flame, and have earned for this species the popular name of "Flame tree,"

a title it shares with the vermillion-flowered *Brachychiton acerifolium* of the order *Sterculiaceæ*. In addition to its stately habit and massive flower-clusters this *Grevillea* possesses attractive foliage. The timber, too, is useful, and furnishes staves of excellent quality, and is used (as is also that of some *Banksias*) in making picture-frames. It may be remarked here that the wood of all our Proteads is of a very distinctive character.

Very closely allied to the *Grevilleas* are the *Hakeas*—the main difference being in the position and character of the inflorescence, texture of seed-vessel, and wing of seed. *Hakea* is (as far as is known) a distinctly Australian genus, embracing about a hundred species. Already gardens are embellished with several varieties. *H. laurina*, syn. *H. eucalyptoides*, is one of the best known representatives, and well worthy is it with its showy flowers and distinctive foliage to represent this unique family. More gorgeous still is the superb *H. grammatophylla*, a variety of *H. multilineata*, which deserves rank as a distinct species. This rare but meritorious plant I described at length in the *Scientific Australian* for June, 1897, and it was figured from my original photographs in the *Gardeners' Chronicle*, January 18, 1896. I also had the honour of sending the Royal Horticultural Society photographs and seeds of this stately shrub. The magnificent Waratah (*Telopea speciosissima*) is sometimes regarded as the national Australian flower. It requires a warm sub-tropical climate to bring its superb blossoms to perfection. Its generic name aptly indicates its attractiveness, which causes the plant to be readily seen from afar.

Many other plants among the Proteads are deserving of careful attention, but cannot now be referred to in a superficial sketch like this.

Distributed throughout the entire length and breadth of the continent may be found charming representatives of the large order *Compositæ*. Moist forest valleys in the southern parts produce abundantly the Native Musk (*Aster* [*Olearia*] *argophyllus*). It has large handsome leaves lined beneath with a silky silver-coloured down, and emits the musk-like odour from which it derives its common name. Timber cut from its gnarled roots forms a handsome veneer that rivals Birds-eye Maple, which it somewhat resembles. *Aster argophyllus* and *Senecio Bedfordi*

attain with us the proportions of trees, which is not common in this order. Included among the *Compositæ* are very many beautiful everlastings which here, as elsewhere, are of wide distribution. Western Australia is specially rich in exquisite examples of these deservedly popular flowers. The genus *Helichrysum* contains some three score species, many of them of more than ordinary beauty. The allied genus *Helipterum* includes about forty species. Asters—many of them strong-growing shrubs—are rather more numerous than any other genus in this order, which, though one of the most extensive in the world, is fourth with us as regards the number of species. The native Daisies (*Brachycome* spp.) have representatives all over the colonies, including New Zealand; but the genus does not seem to extend beyond these limits. Among its two score species are many dainty, attractive, and meritorious plants.

Grasses are represented by a goodly number of species, though exceeded by the *Cyperaceæ*. Extensive areas in the uninhabited interior produce little else but a so-called "Spinifex" (*Triodia irritans*), which is spiny and utterly useless as fodder. Its sharp spines caused considerable irritation to the legs of the unfortunate beasts of burden in all the exploring expeditions that crossed any extent of it. It affords shelter to a few native animals and reptiles which form the scanty food of the few nomadic and indolent natives who traverse occasionally these dreary regions. They burn the grass, and thus drive out their intended prey. The "Kangaroo Grass" (*Anthistiria ciliata*), or, as it should be called by priority, *Themeda triandra* (*Anthistiria Forskühl.*), is a splendid fodder plant. It resists the drought to which the continent is subject, and springs up into growth immediately after rain. "Grass-trees" are common in many parts. The leaves are long and wiry, and the white bases of the young inner leaves are edible and of a nutlike flavour. The flower spikes that surmount the tufts of leaves are frequently several feet in height. Grass-trees (*Xanthorrhæa* spp.) are not grasses, but are allied to the Lilies, and were included among the *Liliaceæ* by our late distinguished Government Botanist. Of liliaceous plants we have many varieties. A number are small but none the less beautiful. Grass-lilies of brilliant hues adorn the pastures. The "Fringe-lilies"

(*Thysanotus* spp.) speedily arrest the attention of even the most casual observer by their exquisite beauty. It is difficult to say which is the more admirable, their delicate tints or the fairy-like fringe from which these plants derive their generic and popular names. The "Queensland or Spear-lilies" (*Doryanthes* spp.) are strictly amaryllidaceous plants of huge size. They produce an excellent fibre. The *Rutaceæ* are represented by about 200 species. The native Fuchsias (*Correa* spp.) are handsome flowering shrubs. *Eriostemon* and *Boronia* are the largest genera, each possessing many horticultural desiderata. *Boronia megastigma* from Western Australia produces copiously its sombre-looking but exquisitely fragrant blossoms. Dried specimens in the herbarium will continue for years to emit this delicious perfume. Several other plants of this genus are of rich beauty.

Ficus macrophylla, the "Moreton Bay Fig," may be chosen to represent the genus *Ficus*, which includes some twoscore native species. It grows into a stately tree and produces large, handsome, glossy leaves. Another representative of the order *Urticaceæ*, the "Tree-nettle" (*Laportea gigas*), has already been referred to. The sting of this nettle causes such severe pain as to actually drive cattle mad when they inadvertently brush against the branches.

Epacrids of delicate and almost inconceivable beauty cover immense areas. They are locally known as "Native Heaths." They are allied to the true Heaths (*Ericaceæ*), which outwardly they somewhat resemble, but differ in structure and dehiscence of anthers. A by no means uncommon, but never-to-be forgotten, sight is an extensive tract, called a "heathbed," covered with these beautiful plants in full bloom and exhibiting the richest as well as the most delicate tints. The genus *Styphelia* is the richest in species. Several plants of this order (*Epacrideæ*) possess more than ordinary horticultural merit, but many of them seem averse to artificial culture—a characteristic which they share with many other desirable native plants. *Epacris impressa* is a striking feature among our indigenous vegetation. Its brilliant and copiously borne blossoms and the vast numbers of individual plants render it exceedingly noticeable and attractive in many an Australian scene. It exhibits great variation in colour, from purest white to brilliant

red, with every conceivable tint between. Of Palms we have but few examples, but many of them are of imposing appearance. These are chiefly confined to the eastern colonies. Even in the desert interior, however, travellers have occasionally come across stately species which mark out veritable oases.

Of *Orchideæ* we possess hardly 300 species, many of them exhibiting the grotesque but nevertheless superb beauty which characterises this order. We have about half a hundred genera, many of which, however, are here represented by a single species. Of these exquisitely beautiful plants the genera possessing most species are *Dendrobium*, *Prasophyllum*, *Caladenia*, *Pterostylis* (often with sensitive labellum and greenish flowers), *Thelymitra*, *Sarcochilus*, and *Diuris*, the pretty little "double-tailed Orchids." Many of these are small but of rare and delicate beauty and rich perfume. Of Ferns we can boast not only a number of species, but large areas in our enchanting "fern-gullies," profusely covered with the exuberant growth of many handsome and stately as well as delicate varieties. Fern-trees of graceful palm-like habit grow in great profusion in humid forest glens, and represent the genera *Alsophila*, *Dicksonia*, and *Cyathea*, while the dwarf but massive trunk of our *Osmunda* (*Todea*) *barbara*, endemic to the southern part of the eastern hemisphere, has frequently been known to attain a weight of considerably over a ton.

The lofty stems of some of our Fern-trees are clothed with a living mass of verdure, consisting of filmy and other tender ferns, representing the genera *Trichomanes* and *Hymenophyllum*, amongst which the cosmopolitan *Hymenophyllum Trunbridgense* may frequently be seen. Draping also the spongy trunks of these graceful Tree-ferns are exquisite examples of the genera *Polypodium*, *Aspidium*, *Gleichenia*, and others. In my "Census of Plants of the Cape Otway Forest" I have recorded from that romantic region forty-three species of these interesting and shade-loving plants, all of which are well worthy of cultivation. An Australian fern-gully presents a truly magnificent sight. Overhead the tops of gigantic Eucalypts form an interlaced canopy and filter the rays of the summer sun. Beneath these the undergrowth forms another and a denser canopy. This shelters the majestic palm-like tree ferns, whose graceful feathery fronds form again a grateful shade for humbler and more tender

species. Every shade of green is here seen. The unfailing stream babbles musically below. Spanning its fern-shaded waters here and there are natural bridges—the huge decaying trunks of prostrate forest giants. These, like the Fern-tree trunks, are daintily draped with tender ferns and delicate mosses, which here grow in richest profusion. Mint-trees (*Prostanthera spp.*) laden with their beautiful blossoms add a new aspect to the scene, which forms an ideal earthly paradise, and entirely baffles description.

One Baobab (*Adansonia Gregorii*) is found in Northern, or more strictly in North-Western, Australia, while the Bottle-trees, of the genus *Brachychiton* (*Sterculia*), are remarkable for their gouty trunks. *B. Delabechei*, F. v. M. (*Sterculia rupestris*, L.), the Queensland Bottle-tree, is of a most quaint appearance. *B. acerifolius*, the “Flame-tree,” presents a gorgeous appearance when in full bloom. Its brilliant blossoms are borne in great abundance, and the flower stalks partake of the vermilion hue of the flowers. At the same time the effect is heightened by the shedding of the large and glossy leaves. Of food plants Australia possesses hardly any. The few edible fruits are for the most part remarkably insignificant. A few yield also edible leaves or roots, but the flora is exceptionally poor in plants suitable for human food.

Timber-producing species are numerous. Many of the seasoned native woods possess a specific gravity greater than that of water, and are remarkable for durability. Medicinal plants are not particularly well represented, or, at any rate, their medicinal qualities are not known. The Eucalypts yield the well-known and widely used antiseptic oil; the *Alstonias spp.* yield a tonic bitter, useful as a febrifuge; *Euphorbia pilulifera* is commonly known as the “asthma herb,” from its use in that ailment; the *Gentianeæ* and many others possess valuable tonic properties. While there are others deserving notice, yet many indigenous plants enjoy a quite unearned reputation for medicinal or curative virtues.

Interesting examples of insectivorous plants are included in the genera *Nepenthes* (three species), *Cephalotus follicularis*, *Drosera spp.*, and *Utricularia*, which I have fully dealt with in my lecture, Insect Traps, “Geelong Naturalist,” vol. v. No. 4. In a superficial and rambling way I have noted a few of

what I thought were the most striking points in our flora, chiefly such as possessed interest from a horticultural or utilitarian standpoint. The topic, however, is so great that all we could possibly do would be to glean a few ears of corn from a field white with harvest.

EXAMINATION IN HORTICULTURE.

1898.

The Annual Examination in the Principles and Practice of Horticulture was held on April 6: 190 candidates presented themselves for examination. Of this number 155 were from all parts of England and 11 from Scotland; 19 gave no address on their papers.

Three hundred marks were allotted as a maximum, and all candidates who obtained 200 marks and upwards were placed in the first class. The total number was 87, or 45·7 per cent.

Those who received 150 and less than 200 marks were placed in the second class. The number was 61, or 32·6 per cent.

Those who obtained 100 and upwards were ranked in the third class. The number was 36, or 19·0 per cent.

The highest number of marks was awarded to Miss O. M. Harrison, of the Horticultural College, Swanley.

The great advantage of systematic training is seen in the fact that of the pupils, *e.g.* of the Swanley College 24 were in the first class and only 4 in the second. Of those of the Technical School of Stafford, there were 12 in the first and 7 in the second class; of the County School of Horticulture, Chelmsford, 8 were in the first class and 4 in the second; while of the Horticultural School, Holmes Chapel, Cheshire, 6 were in the first class and 4 in the second.

Comparing the results with those of last year, we find that the number in the first class has slightly decreased, viz. from 89 to 87. In the second class there is an increase from 55 to 61; and also in the third class from 28 to 36. Those not placed

have fallen from 12 to 5. Comparing the percentages they stand as follows :—

	1897 (184).	1898 (190).
First class	48·3	45·7
Second class	29·8	32·6
Third class	15·2	19·0
Not classed	6·5	2·6

The answers were, on the whole, very satisfactorily given ; and the general standard of those dealing with the Elementary Principles of Vegetable Physiology were somewhat better than was the case in 1897.

There is also a general improvement in the answers to questions referring to Practical Horticulture. Most of the students have a good general idea of the work, although a limited number only went fully into the minor details of it ; but some of these details are essential to a full measure of success, and as far as possible they should be included in the answers.

GEORGE HENSLOW, }
JAS. DOUGLAS, } *Examiners.*

First Class.

	No. of Marks gained.
1. Miss Olive M. Harrisson, Horticultural College, Swanley	285
2. Mrs. Mary Banks, County Technical School, Stafford	280
2. Mr. O. H. Faulkner, County Technical School, Stafford	280
2. Mr. C. Lawrence, County Technical School, Stafford	280
2. Miss Ethel S. Lutley, Horticultural College, Swanley	280
2. Mr. C. Mann, County Technical School, Stafford	280
2. Mr. M. Wilson, Horticultural College, Swanley	280
8. Mr. F. A. Gwilliam, A.R.H.S., Palace Gardens, Glouc.	275
8. Mr. A. Tanner, School House, Cobham, Surrey	275
8. Mr. F. Ovenden, County Technical School, Stafford	275
11. Miss Mary H. Graves, Horticultural College, Swanley	270
11. Miss Ethel E. Rands, Horticultural College, Swanley	270
13. Mr. Henry Mitchell, County Technical School, Stafford	265
13. Miss Jessie H. Price, Horticultural College, Swanley	265
15. Miss Lilian Deane, Horticultural College, Swanley	260
15. Mr. Herman Spooner, Technical Laboratories, Chelmsford	260
15. Mr. Harry H. Thomas, 346 Kew Road, Kew	260

	No. of Marks gained.
15. Mr. Geo. Underwood, Municipal Technical School, Leicester	260
15. Miss Eunice Watts, Horticultural College, Swanley .	260
20. Mr. W. H. Brownridge, County Technical School, Stafford	255
20. Miss Ada C. Bryson, Horticultural College, Swanley .	255
20. Mr. G. Mills, Bayham Gardens, Lamberhurst, Kent .	255
23. Mr. F. Botterill, County Technical School, Stafford .	250
23. Miss Ethel Edmunds, Horticultural College, Swanley	250
23. Mr. Robert C. Gaut, 3 Gloucester Terrace, Kew, Surrey	250
23. Mr. Jos. Gillibrand, Horticultural School, Holmes Chapel	250
23. Mr. Jos. Hope, The New Gardens, Elveden, Thetford, Norfolk	250
23. Mr. Arthur Jones, Horticultural School, Holmes Chapel	250
23. Mr. Harry Miller, Technical Laboratories, Chelmsford	250
30. Mr. F. E. Boyes, 19 Woodland Grove, Whitegate Lane, Blackpool	245
30. Mr. E. T. Cole, Technical Laboratories, Chelmsford .	245
30. Mr. J. K. Cureton, County Technical School, Stafford	245
30. Mr. Geo. Leadbeater, Junr., Horticultural School, Holmes Chapel	245
30. Mr. A. J. Morland, Syon Gardens, Brentford . . .	245
30. Mr. R. Newman, Horticultural College, Swanley . .	245
30. Mr. W. B. Pinder, County Technical School, Stafford	245
30. Mr. Wm. Woodward, The Croft, Wallingford . . .	245
38. Miss Annie Ault, Horticultural College, Swanley . .	240
38. Mr. Hy. Broadbent, Park Hall, Evesham	240
38. Mr. Geo. Butcher, 188 Wellfield Road, Streatham, S.W.	240
38. Mr. John P. Holt, Horticultural School, Holmes Chapel	240
38. Mr. F. Lazenby, Botanic Gardens, Cambridge . . .	240
38. Mr. C. E. Malins, Horticultural College, Swanley . .	240
38. Mr. Geo. Ord, Causey Wood, Marley Hill, Newcastle- on-Tyne	240
45. Mr. Isaac Godber, The Vineyards, Bracon Ash, Norwich	235
45. Mr. W. J. Hurford, 3 Pound Street, Carshalton, Surrey	235
47. Miss Marion Hawkes, Horticultural College, Swanley	230
47. Mr. William H. Neild, Horticultural School, Holmes Chapel	230
47. Miss E. Morland, 7 Gloucester Road, Kew	230

	No. of Marks gained.
47. Mr. G. W. Pyman, Technical Laboratories, Chelmsford	230
51. Mr. John Benson, Liverpool Road, Aughton . . .	225
51. Mr. H. F. Easton, Pullar Road, West Barnet . . .	225
51. Miss Katherine M. Gervais, Horticultural College, Swanley	225
51. Mr. E. F. Jeffrey, Horticultural College, Swanley . .	225
51. Mr. A. Manson, Moreton Hall Gardens, Whalley, Blackburn	225
56. Mr. Arthur Cooper, St. Peter's Street, Wallingford .	220
56. Mr. W. Cranfield, Botanic Gardens, Cambridge . .	220
56. Mr. F. J. Crook, 14 St. John's Park Terrace, Winchester	220
56. Mr. F. H. Harris, Technical Laboratories, Chelmsford	220
56. Miss Hilda Leese, A.R.H.S., 31 Richborough Road, Cricklewood, N.W.	220
56. Mr. A. D. Morris, Barrowmore Hall Gardens, near Chester	220
56. Mr. Arthur Valentine, Technical Laboratories, Chelms- ford	220
63. Mr. E. Banks, County Technical School, Stafford . .	215
63. Mr. Thos. Bell, 1 Alexandria Place, Paisley . . .	215
63. Mr. W. Brown, Cullen Gardens, Cullen, Banffshire, N.B.	215
63. Mr. A. E. Burgess, Technical Laboratories, Chelmsford	215
63. Mr. Hy. Davis, County Technical School, Stafford . .	215
63. Mr. J. Richards, Horticultural School, Holmes Chapel	215
63. Mr. J. C. Tate, The Villa, Bulmer, Welburn, Yorks. .	215
63. Mr. John S. Thompson, Horticultural College, Swanley	215
63. Miss Annie E. Young, Horticultural College, Swanley	215
72. Mr. Thomas Benians, Horticultural College, Swanley	210
72. Miss Ada M. Cassidy, Horticultural College, Swanley	210
72. Miss Elsie G. Callender, Horticultural College, Swanley	210
72. Miss Frances E. H. Gervais, Horticultural College, Swanley	210
72. Mr. A. Stirrat, Botanic Gardens, Glasgow	210
72. Mr. F. W. Pallett, Technical Laboratories, Chelmsford	210
78. Mr. C. Buckland, 3 Datchet Place, Datchet . . .	205
78. Mr. F. B. Davis, 4 Adon Terrace, Hendford Hill, Yeovil	205
78. Mr. E. Walker, Dairy Cottage, Wales, near Sheffield	205
78. Mr. John T. Walker, The Gardens, Fairfield, Cobham, Surrey	205

	No. of Marks gained.
78. Mr. Edward Semper, The Gardens, Scawby Hall, Lincs.	205
83. Miss E. M. Brace, 62 Lower Sloane Street, S.W.	200
83. Mr. Geo. W. Brookbank, 62 Queen's Road, Wimbledon	200
83. Mr. E. J. Pitts, Horticultural College, Swanley	200
83. Mr. F. Weiste, Horticultural College, Swanley	200
83. Mr. W. H. White, Municipal Technical School, Leicester	200

Second Class.

1. Mr. Hy. Brotherston, Gosford Gardens, Longniddry, N.B.	195
1. Mr. J. Burden, Crowmarsh Gardens, Gifford, Wallingford	195
1. Mr. J. Child, County Technical School, Stafford	195
1. Mr. A. H. Davis, F.R.H.S., Albert House, Sutton, Surrey	195
1. Mr. W. Grantham, West Tower, Aughton	195
1. Mr. W. Hamnett, 11 Granville Place, Stone, Staffs	195
1. Mr. R. Hudson, The Paddocks, Swaffham, Norfolk	195
1. Mr. E. Miller, 55 Holly Road, Chiswick, W.	195
1. Mr. Basil G. Stanley, Bredon's Norton, Tewkesbury	195
1. Mr. Thos. H. Usher, Hoe Place, Woking, Surrey	195
11. Mr. A. J. Brabner, 75 Bertram Road, Southbury Road, Enfield	190
11. Mr. Thomas Carr, Undermount Gardens, Bonchurch, Isle of Wight	190
11. Mr. Louis Hales, Horticultural College, Swanley	190
11. Mr. C. T. Illsley, Amblecote, Cobham, Surrey	190
11. Mr. J. Jeffery, Moor Court Gardens, Oakmoor, Stoke- upon-Trent	190
11. Mr. J. Jordan, County Technical School, Stafford	190
11. Mr. J. Lee, Gosford Gardens, Longniddry, N.B.	190
11. Mr. J. F. Mitchell, Horticultural College, Swanley	190
11. Mr. A. J. Pye, Technical Laboratories, Chelmsford	190
11. Mr. W. Sproston, Great Haywood, Stafford	190
21. Mr. Chas. Fogden, Poplar Villa, South Hayling, Hants	185
21. Mr. H. R. Judson, The Gardens, Abbots Worthy House, Winchester	185
21. Mr. J. Prescott, Brookfield Lane, Aughton	185
24. Mr. Hy. Child, County Technical School, Stafford	180

24. Mr. C. Sellars, 5 Leaman Terrace, Linthorpe Road, Middlesboro'	180
26. Mr. E. Dolman, Wychnor Park Gardens, Burton-on- Trent	175
26. Mr. Wm. Laurence, Technical Laboratories, Chelmsford	175
26. Mr. S. Lyversage, County Technical School, Stafford .	175
26. Mr. Wm. Morris, Horticultural School, Holmes Chapel	175
26. Mr. T. Ottewell, County Technical School, Stafford .	175
26. Mr. Edward Rustige, Horticultural School, Holmes Chapel	175
26. Mr. Geo. H. Wicking, Municipal Technical School, Leicester	175
33. Mr. W. Burgess, Bredon's Norton, Tewkesbury . .	170
33. Mr. J. Clark, Bank Cottage, Waterhouses, Ashbourne .	170
33. Miss C. F. Fellows, Horticultural College, Swanley .	170
33. Mr. A. Morton, Horticultural School, Holmes Chapel	170
33. Mr. Wm. E. O'Hara, Horticultural College, Swanley .	170
33. Mr. H. P. Appleton, Municipal Technical School, Leicester	170
33. Mr. J. P. Quinton, 3 Ferry Road, Long Ditton . .	170
33. Mr. A. Shaw, Staincross, near Barnsley, Yorks. . .	170
33. Mr. W. Smith, Bredon's Norton, Tewkesbury . .	170
33. Mr. W. C. Smith, Botanic Gardens, Glasgow . .	170
43. Mr. L. R. Baker, Blagdon House, Merton Road, Merton	165
43. Miss Gertrude Bridger, Primrose Bank, Aughton, Ormskirk	165
43. Mr. G. J. Goodall, The Gardens, Streatley House, Reading	165
43. Mr. W. Ness, Aberlady, Longniddry, N.B. . . .	165
43. Mr. E. Pedley, Holywell Green, near Halifax, Yorks. .	165
43. Mr. R. Sumner, Liverpool Road, Aughton . . .	165
43. Mr. R. Y. White, 67 Queen's Street, Cheapside, E.C. .	165
50. Mr. L. Davenport, Horticultural School, Holmes Chapel	160
50. Mr. Maurice Field, Newnham House, Wallingford .	160
50. Mr. E. Russell, Municipal Technical School, Leicester	160
53. Mr. W. Galloway, Gosford Gardens, Longniddry, N.B.	155
53. Mr. J. Humphreys, Hillside, Winchmore Hill, N. . .	155
53. Mr. R. Jones, Aughton Springs, Aughton . . .	155
53. Mr. W. T. Smith, County Technical School, Stafford .	155

	No. of Marks gained.
53. Mr. P. H. Jones, County Technical School, Stafford .	155
53. Mr. H. Weddell, Hayeroft Cottage, Surbiton . . .	155
59. Mr. H. Holmes, The Gardens, Garvald House, Dolphinton, N.B.	150
59. Mr. B. Ling, Technical Laboratories, Chelmsford .	150
59. Mr. S. J. Sayer, Technical Laboratories, Chelmsford .	150

Third Class.

1. Mr. F. E. Belcher, 26 First Avenue, Bush Hill Park, Enfield, N.	145
1. Mr. A. W. Browning, Gosford Gardens, Longniddry, N.B.	145
1. Mr. Henry Kingham, Technical Laboratories, Chelms- ford	145
1. Mr. E. Powell, Heveningham Hall Gardens, Yoxford, Suffolk	145
5. Mr. W. Hind, Town Green, Aughton, Ormskirk . . .	140
5. Mr. Henry Hope, Municipal Technical School, Leicester	140
5. Mr. P. M. Marshall, Technical Laboratories, Chelmsford	140
8. Mr. F. South, Horticultural School, Holmes Chapel .	135
8. Mr. H. L. Symes, The Gardens, Milburn, Esher . . .	135
10. Mrs. J. Chapman, 1 Leopold Road, Wimbledon Park, Surrey	130
10. Mr. C. New, 11 Blendworth Terrace, Clarence Road, Ventnor, Isle of Wight	130
10. Mr. E. H. Niblett, The Gardens, Los Altos, Sandown, Isle of Wight	130
10. Mr. A. McQuaker, 8 Victoria Place, Trinity, Edinburgh	130
10. Mr. J. F. Sargeant, Horticultural College, Swanley .	130
10. Mr. D. A. Simes, Technical Laboratories, Chelmsford	130
10. Mr. S. W. Whalley, Streatley, Reading	130
17. Mr. H. R. Davey, 14 Albion Road, St. Albans . . .	125
17. Mr. Robt. Perry, Milburn Gardens, Esher	125
17. Mr. J. Wilson, Castle Street, Wallingford	125
20. Mr. J. Hubbard, The Gardens, Mountfield, Hernhill, near Faversham	120
20. Mr. G. Linter, 3 East Street, Ventnor, Isle of Wight .	120
20. Mr. J. B. Pratt, Technical Laboratories, Chelmsford .	120
20. Mr. W. G. Taylor, Technical Laboratories, Chelmsford	120
20. Mr. W. H. Wield, Burches Lodge, Kingston Hill . .	120

20. Mr. S. Wren, Technical Laboratories, Chelmsford .	120
26. Mr. John Atkins, Rose Cottage, High Street, Caterham	115
26. Mr. Samuel E. Brown, Oak Road, Caterham . .	115
26. Mr. J. Dent, Howberry Park, Crowmarsh Gifford, Wallingford	115
29. Mr. F. Wichelo, St. Mary's Street, Wallingford .	110
30. Mr. J. H. Brand, Essendene Cottages, Caterham .	105
30. Mr. G. Hunter, Gosford Gardens, Longniddry, N.B. .	105
30. Mr. G. Braddy, Technical Laboratories, Chelmsford .	105
30. Mr. H. G. Chick, Moray Villa, Elm Grove, Caterham	105
34. Mr. J. Fudge, Horticultural School, Holmes Chapel .	100
34. Mr. C. Rymes, 28 Cottage Grove, Surbiton . .	100
34. Mr. A. Wilkins, Martyr Worthy, near Winchester .	100

ROYAL HORTICULTURAL SOCIETY'S EXAMINATION IN HORTICULTURE.

1898.

QUESTIONS.

Eight questions only to be answered : four from Division A and four from Division B.

DIVISION A.

ELEMENTARY PRINCIPLES.

1. Describe the methods of propagation of different weeds; explain why Groundsel and Chickweed and the large white-flowered *Convolvulus* are particularly troublesome. What are the best means of exterminating these plants?

2. Point out the importance to the plants of a good circulation of air in a hot-house, and the consequences of a stagnant condition of the atmosphere within it.

3. Describe the different functions of leaves, and the best way to secure their due performance.

4. What are the component parts of a flower, and of what use are they respectively to the plant?

5. What external conditions are favourable for inducing variations to

appear in cultivated plants; and how would you proceed in order to fix any variation?

6. What parts of the *flower* are retained and altered in forming the *fruit* of the Peach, Melon, Mulberry, Fir-cone, and Pine-apple?

7. To what Natural Orders do the following trees belong:—Tulip tree, Maple, Apricot, Ash, Laburnum, Guelder-rose, Horse-chesnut, Horn-beam, Thuia, and Evergreen Oak? Which are natives of this country?

8. Describe the structure of the *bulb* of the White Lily, the *corm* of Gladiolus, the *creeping-stem* of Couch-grass, the *rhizome* of the Flag, and the *tuber* of the Potato; and explain their uses to the plants.

DIVISION B.

PRACTICE.

9. Describe Landscape Gardening as an art.

10. Describe the formation of a Garden Lawn, and the details of the work necessary to keep it in condition during the year.

11. What are the preliminary operations necessary to the laying-out of a garden for Fruit and Vegetable culture? Describe the arrangement of the Fruit Trees, and the method of planting them.

12. A garden having four walls facing north, south, east, and west, what varieties of Fruit Trees should be planted on each? Describe their first year's pruning and training.

13. Give full details of the propagation and culture of Grape Vines and Fig Trees in pots.

14. Describe the culture of Sea Kale, Asparagus, and French Beans; and the best method of forcing them.

15. What are the best Manures for Kitchen and Fruit Gardens? How ought they to be applied, and when?

16. Describe the propagation and culture of Roses and Carnations intended to be cultivated under glass.

TREES AND SHRUBS IN THE ISLE OF WIGHT.

By SAMUEL HEATON, F.R.H.S.

It is with some diffidence I write of the trees and shrubs in the Garden Isle; for I seem to hear many Fellows of the Royal Horticultural Society say that they have been through the island many times, both on foot and by coach, and have observed nothing of special excellence to note. And this is quite true. But the trees and shrubs I am about to draw attention to are to be found in private gardens and not by the highways and hedges, where many of them would undoubtedly luxuriate and lend additional beauty to the charms of this naturally picturesque island. The enterprise displayed by private individuals in beautifying their gardens should be a stimulus to all public bodies to beautify the island as a whole, and make it more attractive to visitors, who are an important factor in the prosperity of the Garden Isle. The monotony of the streets and buildings might be relieved by trees and shrubs planted in suitable positions and convenient places; the public halls might be made more attractive and inviting if clothed with window-boxes; and the open spaces could be made more picturesque and interesting if relieved with shrubs in boxes or tubs, as may be seen in Manchester and other places. But, alas! the public authorities seem to take no interest in the arboricultural charms of the island.

The generally undulating surface of the Isle of Wight undoubtedly affords exceptional convenience and opportunity for the cultivation of rare trees and shrubs of a so-called Half-hardy nature.

The length of the island, east to west, is about twenty-two miles; the width, north to south, about thirteen miles; and the circumference about sixty miles. The average rainfall is about 28 inches per annum, and the mean temperature about 50° F.

In addition to the ordinary forest trees or "hard-woods," and the Coniferæ, the Euonymus, Tamarisk, Laurustinus, Bays, Fuchsias, Veronicas, and Hydrangeas are to be seen well represented in all parts of the island; whilst here and there in some of the best-kept gardens, and those most favourably situated, may be seen plants of Eucalyptus, Phillyrea latifolia,

Griselinia littoralis, Myrtles, *Escallonia macrantha*, *Choisya ternata*, *Aralia Sieboldi*, *Leycesteria formosa*, *Paulownia imperialis*, *Bignonia radicans*, *Aloysia citriodora*, *Photinia serrulata*, *Phoenix dactylifera*, *Chamærops humilis* and *Fortunei*, *Phormium tenax*, *Coronilla glauca*, *Daphne Indica*, *Phlomis fruticosus*, *Desfontainea spinosa*, *Buddleia globosa*, *Arbutus*, *Forsythia viridissima*, and others, which will be mentioned as growing in the following places, which are amongst the largest and best-kept gardens in the Garden Isle.

BROOKE HOUSE GARDENS.

In the gardens of Brooke House, the residence of Sir Chas. Seely, Bart., are to be found the following noteworthy trees and shrubs: *Cupressus macrocarpa*, over 25 feet high and 18 feet through at the base; *Pinus insignis*, which evidently does well for seaside planting; for this, like many other specimens, seems to revel in its position—it is 24 feet high and 17 feet through at the base.

Pinus excelsa and *Abies Nordmanniana* are fine specimens, considering the short time they have been planted.

Large healthy plants of *Cedrus Deodara*, *C. Atlantica*, and *C. Libani* are also very conspicuous.

Other Coniferæ worth notice are *Retinospora filifera*, *R. aurea*, *R. plumosa*, and *R. squamosa*; *Taxus baccata* and *T. elegantissima*, *Thuja plicata* (Lobbi of gardens), *Juniperus Chinensis*, *Cryptomeria elegans* and *C. japonica*, and the "Blue Spruce," *Picea pungens glauca*.

Magnolia Lenei and *M. conspicua* diffuse a glorious scent from their beautiful showy flowers.

The showy *Pyrus malus floribunda* and *P. atosanguinea* cannot be overlooked.

Amongst other plants of interest are a Spanish Cork-oak (planted by Garibaldi in 1864; the dimensions are, stem 18 inches in diameter, height of tree 27 feet, spread of branches 120 feet), *Aralia spinosa*, *Cornus Spathii*, *Garrya elliptica*, which requires protection, *Hibiscus syriacus*, *Hippophaea rhamnoides* (Sea Buckthorn), *Andromedas* and *Daphnes* (in variety), *Staphylæa colchica*, *Deutzia candidissima*, *Berberis Thunbergii*, *Acer negundo* var., and *A. palmatum atropurpureum*. The ornamental Grasses include varieties of *Eulalia*, *Bambusa*, *Arundo*, and *Gynerium*.

argenteum; one clump of the latter has produced over 200 glorious plumes of inflorescence. These gardens, which are situated on the south coast, are well worthy of a visit.

OLD PARK.

These gardens, which belong to Mrs. Spindler, are beautifully situated in the Undercliff, about three miles from Ventnor, on the south coast. Being so well sheltered and close to the sea will probably account for the fine healthy plants of *Magnolia grandiflora*, *Laurus nobilis*, *Garrya elliptica*, *Aucuba japonica*, *Arbutus* (several varieties), *Fuchsia Riccartoni*, *Choisya ternata*, *Escallonia* (in variety), *Phillyrea latifolia*, *Benthamia fragifera*, *Veronica* (in variety), *Colletia cruciata*, *Sumachs* (in variety), *Photinia arbutifolia*, *Ceanothus* (in variety), *Chamaerops Fortunei* and *C. excelsa*, *Phormium tenax*, *Dracæna australis*, *Yucca aloifolia variegata*, *Y. gloriosa* and *Y. recurva*, *Eucalyptus globulus*, and *Bambusa* (in variety). The above are all grown in the open air, and receive no protection whatever.

It may interest some to know that *Calla æthiopica* is grown as a hardy outdoor aquatic, and does remarkably well.

STEEPHILL CASTLE.

These gardens are one mile west of Ventnor, on the south coast; they are charmingly picturesque, and contain some fine specimen plants. Amongst the most interesting are *Photinia serrulata*, *Taxodium distichum*, *Benthamia fragifera*, *Podocarpus chilina*, *Rhus Cotinus*, *Salisburia adiantifolia*, *Carya alba*, *Colletia cruciata* and *C. horrida*, *Magnolia grandiflora*, *Liriodendron tulipifera*, *Clerodendron Bungei*, *Erica arborea*, and *Garrya elliptica*, *Pyrus sorbus*, *Phormium tenax*, *Quercus*, and *Pittosporums* (in variety).

EAST DENE.

These gardens are situated about one mile east of Ventnor, close to Bonchurch Old Church and at the entrance to the far-famed landslip. They are well sheltered and close to the sea. The most noteworthy trees and shrubs are fine healthy plants of *Pittosporum tenuifolium*, *Garrya elliptica*, *Fuchsia gracilis*, *Choisya ternata*, *Magnolia Watsoni*, *Laurus nobilis*, *Veronica*

salicifolia, *Daphne laureola*, *Colletia cruciata*, *Arbutus rubra*, *Aucuba vera nana* and *A. viridis*, *Buddleia globosa*, *Erica coccinea* and *E. melanthera*, *Cupressus Lawsoniana* and *C. macrocarpa*, *Cedrus deodara*, *Hydrangea paniculata grandiflora*, *Deutzia scabra flore pleno*, *Spiræa confusa*, *Staphylæa colchica*, *Photinia serrulata*, *Dracæna indivisa*, *Escallonia macrantha*, *Eleagnus longipes*, *Aralia Sieboldi variegata*, *Aloysia citriodora*, *Chamærops Fortunei*, *Yucca gloriosa*, *Camellia* (Adrien Lebrun), *C. alba compacta*, and *C. alba plena*.

ST. CLARE CASTLE.

These gardens are close to the sea, about one mile east of Ryde. Amongst the most interesting plants we may mention *Edwardsia* (*Sophora*) *microphylla*, which grows freely on a south wall, is quite hardy, and never fails to bloom; there is also a fine specimen of *Ilex latifolia* over 20 feet high. This plant is rather rare in the island. *Photinia serrulata* and *glabra* are fully exposed to the sea-breezes, and do well; *Potentilla fruticosa* does best in a sunny position: *Diospyros virginiana*, which has fruited several times; *Eucalyptus Gunnii*, which is much hardier than *E. globulus* and *E. cordata*. In a garden near St. Clare there is a specimen of *E. Gunnii* over 30 feet high, which lives and grows vigorously amidst the gales and climatic changes experienced on the north coast of the island.

Mr. Meehan, the gardener at St. Clare, rightly considers it folly to plant trees and shrubs of doubtful hardiness in warm sheltered positions where the morning sun and the cutting east winds can play on them, for by the former they are hurried into growth prematurely, whilst by the latter the tender growth is withered or dried up. The cause of the plants dying is generally attributed to the unusual severity of the winter or to the tenderness of the plant; but this, in nine cases out of ten, is a wrong verdict.

Magnolia grandiflora does well in all parts of the island; the *Loquat* (*Eriobotrya Japonica*) is grown with great success at St. Clare.

ST. JOHN'S VICARAGE, RYDE.

The Rev. H. Ewbank possesses perhaps the finest collection of rare trees and shrubs to be found in the Garden Isle. Through

his kindness I am able to give the following interesting notes, which I hope may prove of some value to others.

Fremontia Californica, a malvaceous shrub, does well in a semi-shaded spot.

Abutilon vitifolium, from Chili, though not considered hardy, has done remarkably well so far in the open, and should prosper in the Isle of Wight.

Pterostyrax hispidum, from Japan, blooms in corymbose racemes, and is a good thing and easy to grow.

Mandevilla suaveolens, from Buenos Ayres, is a splendid climber of great fragrance. It should be planted in April in a sunny sheltered spot, and given a little protection in winter, as it is not quite hardy.

Poinciana Gillisii makes a fine shrub. It is easily raised from seed, and when it once commences to flower it will repay anyone for any amount of trouble taken with it.

Magnolia Lenei, *M. parviflora*, *M. Watsoniana*, *M. conspicua*, *M. grandiflora*, and *M. stellata* are to be found doing well in Mr. Ewbank's garden.

Colletia bicktonensis is a strange-looking plant, and should be well worth growing, if only for its distinctive and peculiar form.

Olearia Hastii, a nice bush from New Zealand, and does well in most parts of the island.

Sikkim *Rhododendrons*, *R. Aucklandi*, *R. Thompsoni*, *R. Hodgsoni*, and others flourish remarkably well with canvas protection in winter and a top-dressing of cow manure in summer.

Rosa ruberrima is a shrub that does well, and grows to a large size; *Pomegranates* do well, so far as making growth, but they do not bloom very freely.

Edwardsia grandiflora, a leguminous plant with yellow flowers, is much admired.

Exochorda grandiflora is a handsome shrub from 4 to 6 feet high, and is quite hardy. It requires little pruning.

Lonicera fragrantissima, a native of China, makes bushy growth, and produces fragrant white flowers during the winter season.

Paulownia imperialis is a handsome and fast-growing tree, and should be planted in a moist situation. As it blossoms early, its buds are sometimes injured by the frosts.

Lardizabala biternata requires a wall. It is a tall climbing shrub with dark green persistent leaves, and bears purplish flowers in drooping racemes in winter.

Choisya ternata thrives remarkably well in this garden as in many others in the island. If Mr. Ewbank were allowed to grow only one shrub in his garden, this, he says, would be his choice.

Cistus, in variety, are grown.

Limonia trifoliata, or hardy lemon, does well here.

Neviusia alabamensis is sometimes grown in a greenhouse ; but it thrives in the open air in this garden.

Ozothamnus rosmarinifolius is a pretty shrub, but not quite hardy. The small white aster-like flowers are so effective that the plant is often called "Snow in Summer."

Parrotia persica, well known for the lovely autumnal tints displayed by the foliage when dying off, likes a warm situation and a rather dry border.

Rhododendron præcox is a very attractive shrub, and well known.

Vitis heterophylla humulifolia should be grown against a wall in a sunny place, so as to ripen its exquisite turquoise blue berries, which are most attractive.

Xanthoceras sorbifolia, a native of China, grows to a height of about 15 ft. It is an extremely pretty flowering and most handsome-leaved shrub, and as it becomes better known will be sure to be much more largely grown.

Rubus biflorus, or the sometimes called "Whitewashed Bramble," is a tall-growing species with whitish spiny stems and simple three-lobed leaves that are tomentose on the under side.

Rubus deliciosus is another beautiful plant from the Rocky Mountains, and which likes moisture.

Camellias grow luxuriantly and bloom profusely.

Cercis siliquastrum, or "Judas Tree," thrives in a damp, warm situation, and grows from 15 ft. to 20 ft. high.

Chimonanthus fragrans, with its deliciously fragrant flowers, produced in abundance in winter when the plant is leafless, seems thoroughly at home.

Rhynchospermum jasminoides, though generally grown in a greenhouse, seems quite hardy here.

Amongst other plants worthy of mention are *Cotoneaster Simonsii*, *Photinia japonica*, *Clerodendron foetidum*, *Clematis Davidiana*, *Caryopteris mastacanthus*, *Fuchsia Riccartoni*, and *Coronilla Emerus*.

OSBORNE HOUSE.

In the Queen's gardens at Osborne are to be found some very interesting trees and shrubs. On the north coast of the island, and with a gentle slope towards the sea, plants seem to do well with little or no protection, Camellias in particular. There is a large tree of *Liriodendron tulipifera* and fine healthy specimens of *Garrya MacFadyani*, *Berberis Darwinii*, *Bupleurum fruticosum*, *Griselinia littoralis*, *Callistemon viridiflorum*, *Fagus Cunninghamii* (Evergreen Beech), *Myrica Californica*, and *Colletia spinosa*.

Amongst the most interesting trees planted as memorials we may mention *Tilia Europea*, which was planted by Her Majesty in commemoration of the Diamond Jubilee, on July 28, 1897. Princess Beatrice also planted a *Fagus cuprea* in commemoration of that event.

H.R.H. the Prince Consort planted a *Magnolia grandiflora* in the flower garden on March 10, 1846, which is doing remarkably well.

H.S.H. Prince Leopold of Saxe-Coburg and Gotha planted, August 2, 1850, a *Pavia californica*; and on October 26 in the same year a *Torreya nucifera* was planted in memory of Louise, Queen of the Belgians.

On June 30, 1851, Leopold I., King of the Belgians, planted a *Mahonia nepalensis*.

In May 1861, H.R.H. the Duchess of Kent planted a *Podocarpus andina*; whilst on August 3 in the same year H.R.H. Prince Frederick William of Prussia planted a *Torreya Myristica*.

On February 10, 1862, Her Majesty the Queen planted at the Swiss Cottage for H.R.H. the Prince Consort a *Sciadopitys verticillata* (the Umbrella Pine).

On August 6, 1873, H.R.H. the Duke of Edinburgh planted a *Prumnopitys elegans*.

Her Majesty the Queen planted at Swiss Cottage, on February 18, 1878, a Myrtle (in honour of the marriage of her grand-daughter, Princess Charlotte of Prussia), grown from a

sprig of the Princess Royal's marriage bouquet, January 25, 1858.

On August 19, 1879, Prince Alfred of Edinburgh planted at Swiss Cottage an *Arthrotaxis selaginoides* and Princess Marie of Edinburgh an *Arthrotaxis Gunneana*.

The Duc de Nemours planted, in 1848, a *Cryptomeria japonica*.

An *Abies pinsapo*, planted by Her Majesty the Queen, May 24, 1849, is now over 40 feet high and about 8 feet in circumference.

The Maharajah Dhuleep Singh planted a *Cedrus deodara*, on August 24, 1854, on the garden lawn.

The Emperor of the French planted an *Abies nobilis*, and the Empress of the French an *Abies pinsapo*, on August 8, 1857, on the lawn.

H.I.H. Archduke Ferdinand Maximilian of Austria, afterwards Emperor of Mexico, planted a *Thujopsis borealis* and H.I.H. the Archduchess Charlotte of Austria, afterwards Empress of Mexico, a *Cupressus Lawsoniana*, on August 3, 1861.

The King of Sweden planted at Swiss Cottage, on August 14, 1861, a *Pinus radiata*.

H.R.H. the Prince of Wales and H.R.H. the Princess of Wales each planted an *Abies pinsapo* at Swiss Cottage two days after they were married, namely, on March 12, 1863.

Altogether there are something like two hundred and fifty memorial trees, each one recalling some person or event of interest.

WIDTH OF TIRES ON WAGON WHEELS.

REPORT OF EXPERIMENTS IN AMERICA.

THE width of tire on wagon wheels which is most conducive to easy draught is a problem of the highest practical importance, for on its solution may depend the saving of a considerable sum on the year's labour bill. Estimates made by General Roy Stone put the total wagon transportation in the United States at about 500,000,000 tons, the public roads having an aggregate length of 1,500,000 miles. The average distance of haul is put at eight miles, and the average cost of transporting one ton this length is assumed to be \$2, making the total yearly cost for wagon

freight \$1,000,000,000. It is claimed that this freight could be moved the length of eight miles over first-class roads at an average cost of eighty cents per ton, so that a saving of \$600,000,000 per annum might thus be effected. This sum represents about one-fourth of the value, on the farms, of all the farm products of the United States. An amount of about \$20,000,000 is paid out each year for the maintenance of public roads outside the cities of the United States, yet after the expenditure of this sum these roads are no better at the end of the year than at the beginning. All ratepayers are interested in reducing this expense, provided the roads are not impaired in efficiency. There exists a widespread belief that narrow wheels are amongst the most destructive agents to streets, to macadam, gravel, and dirt roads, and to the fields, meadows, and pastures of the farm. The introduction in recent years of the wide-tired metallic wheel at about the usual price of the ordinary narrow-tired wheels has removed one very serious objection to the proposed substitution of broad tires for the narrow tires hitherto in use. In order to obtain reliable information on so important a matter, numerous trials, extending over a year, so as to be subject to all kinds of weather, have been carried out at the Missouri Agricultural Experiment station. The draught or pull was in all cases determined by means of a self-recording dynamometer, and the net load in every trial was the short ton of 2,000 lbs. Contrary to what was anticipated, in the majority of cases the draught was materially less when tires 6 in. wide were used than when the tests were made with tires of the standard width of $1\frac{1}{2}$ in. We give a brief summary of the results:—

On macadam road, as an average of the two trials made, a load of 2,518 lbs. could have been hauled on the broad tires with the same draught as a load of 2,000 lbs. required on the narrow tires. On gravel road, except when wet and sloppy on the top, the draught of the broad-tired wagon was very much less than that of the narrow-tired wagon; averaging the six trials, a load of 2,482 lbs. could be hauled on the broad tires with the same draught as was required for a load of 2,000 lbs. on the narrow tires.

The trials on dirt roads gave varying results, according to the condition of the road. Thus when it was dry, hard, and free from dust, 2,530 lbs. could be hauled on the broad tires with

the draught required for 2,000 lbs. on the narrow tires. When the surface was covered with two or three inches of very dry loose dust the results were unfavourable to the broad tire. On clay road, muddy and sticky on the surface and firm underneath, the results were uniformly unfavourable to the broad tires. On the other hand, on clay road deep with mud and drying on top, or dry on top and spongy beneath, numerous tests were uniformly favourable to the broad tire. The difference ranged from 52 to 61 per cent.; on the average about 3,200 lbs. could be hauled on the broad tires with the draught required for 2,000 lbs. on the narrow tires. It was in this condition of dirt road that the broad tires showed to greatest advantage. As the road dries and becomes firmer the difference between the broad and narrow tires gradually diminishes, until it falls to about 25 to 30 per cent. on dry, hard, smooth dirt, gravel, or macadam road, in favour of the broad tire. On the contrary, as the mud becomes softer and deeper, a condition is at length reached when the mud adheres to both types of wheel; here the advantage of the broad tires ceases entirely and the narrow tires pull materially lighter. Generally it may be said that during the greater part of the year, and at times when the dirt roads are most in requisition and when their use is most imperative, the broad-tired wheels have a considerably lighter draught than the narrow-tired.

Many tests on meadows, pastures, stubble land, corn ground, and ploughed ground in every condition, from dry, hard, and firm to very wet and soft, showed without any exception a large difference in draught in favour of the broad tires—a difference ranging from 17 to 120 per cent. The investigations further showed that six inches is the best width of tire for a combination farm and road wagon, and that both axles should be the same length, thereby securing that the front and hind wheels shall run in the same track. This inquiry differs in character from some of the abstruse problems the solution of which is attempted at American experimental stations; but there can be no question as to its utility.

REPORT ON HOES.

Three new hoes were sent to the Society's Gardens at Chiswick for trial, by Rev. Foster-Melliar, Sproughton Rectory, Ipswich ; Mr. George Abbey, Avery Hill, Eltham ; Mr. G. W. Shailer, 3 Avenue Road, Brentford.

(1) Sproughton Hoe (Foster-Melliar).—This hoe is somewhat in the form of an improved Dutch hoe, with double edges, having a point at one end of the hoe for using as a prong to get out deeply rooted weeds. Another advantage of this tool is that, by having double edges, it cuts through the soil when pushed forwards and drawn backwards, never clogging with soil, and always bright and clean. A most useful hoe.

(2) Drill Hoe (Abbey).—For drawing seed drills this heart-shaped hoe is very useful, as the drills can be quickly drawn at a uniform depth. It is only suitable for such operations.

(3) Pronged Hoe (Shailer).—Although the maker describes this tool as a hoe, it is really more like a hand cultivator, as it consists of a number of prongs revolving on an axle. These prongs or teeth will penetrate loose soil to the depth of two or three inches, dislodging all small weeds ; and, being easy to work, a man may push the implement before him at a good walking pace. On light or loose soils this tool should prove an acquisition, but on firm or solid soil it is of no service.

REPORT ON RADISHES GROWN AT CHISWICK, 1898.

Twenty-four stocks of Radishes were received, and all were sown in a cold frame on March 16. The lights were not put on the frames except on those nights when there was danger of frost. The whole collection was taken up to the Drill Hall Meeting on May 10 and examined by the Fruit and Vegetable Committee.

A.M.—Award of Merit.

1. Earliest of All Olive (Sutton).—Ready for use May 2. Roots true turnip-shape, pale red, with remarkably short tops.

2. Earliest Red Long (Barr).—Ready for use May 9. Roots long, pinkish red, with moderate tops.

3. Early Deep Scarlet (Watkins & Simpson).—Ready for use April 30. Roots scarlet, turnip-shaped, with moderate tops.

4. Early Forcing deep scarlet Turnip (Watkins & Simpson).—Ready for use April 30. Same as No. 18.

5. Early Frame Long (Sutton).—Ready for use April 30. Roots long, red, with short compact tops.

6. Early White Long (Barr).—Ready for use May 10. Roots long, white, with large tops. Late.

7. Early White Turnip-shaped (Barr).—Ready for use May 3. Same as No. 21.

8. First of All White Olive-shaped (Barr).—**A.M.** May 10, Same as No. 11. Ready for use April 30.

9. First of All Scarlet Olive-shaped (Barr).—**A.M.** May 10, Same as No. 10. Ready for use May 2.

10. Forcing Carmine Oval (Sutton).—**A.M.** May 10. Ready for use May 2. Roots olive-shaped, bright red, moderate tops. An excellent stock.

11. Forcing White Olive (Sutton).—**A.M.** May 10. Ready for use April 30. Roots olive-shaped, pure white, with very small compact tops.

12. French Breakfast Olive-shaped (Sutton).—Ready for use April 30. Roots olive-shaped, red tipped with white, short compact tops. A good stock of this old variety.

13. French Breakfast (Watkins & Simpson).—Same as No. 12.

14. Long-shaped (Toogood).—Ready for use May 9. Similar to but a later form of No. 5.

15. Red Turnip (Watkins & Simpson).—Ready for use May 3. Roots bright red, with very short compact tops.

16. Red Turnip White-tipped (Watkins & Simpson). Ready for use May 7. Roots, as the name indicates, with short tops.

17. Scarlet Intermediate (Barr).—Ready for use May 2. Roots olive-shaped, scarlet tipped with white. Moderate tops.

18. Scarlet Perfection Turnip-shaped (Barr).—Ready for use April 30. Small compact tops. A very fine stock.

19. Scarlet Queen (Barr).—Ready for use May 9. Roots long, deep red, with moderate tops.

20. Turnip-shaped (Toogood).—Ready for use May 3. A darker form of No. 15.

21. White Forcing Turnip (Sutton).—Ready for use May 2. Roots very even in size, with remarkably short tops.

22. White Turnip (Watkins & Simpson).—Ready for use May 7. A good stock of the old white variety.

23. Wood's Frame (Watkins & Simpson).—**A.M.** May 10. Ready for use May 3. Roots long scarlet, with moderate tops. An excellent stock of this old favourite variety.

24. Wood's Frame White (Watkins & Simpson).—Ready for use May 7. A later and inferior white form of No. 23.

MR. JOHN WEIR.

On April 28, 1898, there passed away at Clydesdale Cottage, New Barnet, one of the old collectors of the Royal Horticultural Society. In 1861 he was sent out by the Society to Brazil, where he spent two years in collecting, and proceeded thence to the United States of Columbia. Unfortunately no sooner had he reached New Granada than he had an attack of fever, "which after a few days, went off, leaving him paralysed in all his limbs, from the neck downwards." This was in the autumn of 1864. However, he met with good friends and kind nursing, and Mr. F. Stacey, Consul at Santa Martha at the time, at once communicated with the Society. The Council at once directed that every care and attention should be paid to Mr. Weir, and that he should be sent home as soon as he was able to bear the voyage. He came home in the autumn of 1865, and it was soon recognised that his case was a hopeless one.

An appeal was made to the Fellows of the Society for subscriptions towards a fund to provide for Mr. and Mrs. Weir. This was strongly supported in the *Gardeners' Chronicle*, with the result that a joint annuity on the lives of Mr. and Mrs. Weir of a little over £50 a year was received. During his brief career as a collector, Mr. Weir introduced many beautiful plants. Among other things he introduced a large number of living Orchids, but the cultivation of Orchids was not so well understood then as now; consequently fewer stand to his credit than might otherwise have been the case. Lists of the plants he sent

home, together with descriptions of new species, will be found in the *Proceedings* of the Society between 1863 and 1865. Apart from this, we have abundant evidence of Mr. Weir's industry and keenness of observation. In addition to flowering plants and Ferns, he made a very extensive collection of Mosses and Liverworts, including numerous new species, which were published in vol. xii. of the *Journal of the Linnean Society*. He retained a considerable portion of his collections till within a few days of his end, when, at his special request, it was sent to Kew.

Would that the Society had the means of sending a collector now to the mountainous districts of Central and Northern China, where such a wealth of new and probably hardy plants lie waiting for us!

THE ROYAL HORTICULTURAL SOCIETY AND THE SEVERAL RAILWAY COMPANIES.

The Council of the Society are very frequently receiving communications from Fellows to the effect, "Why do not you arrange for cheap tickets on show-days for Fellows by rail?" and they have at various times semi-officially approached individual railway companies, but without success.

Thinking that an official letter addressed to all the companies at the same time might meet with greater favour, they caused the following letter to be sent to them all:—

"Sir,—I am instructed by the Council of the Royal Horticultural Society to submit to the Directors of your Company the following facts with a view to obtain for the members of the above Society facilities similar to those which have been granted to the Royal Counties' Agricultural Society, the Bath and West of England, and other Societies having analogous objects, with admitted benefit both to the railway companies and to the Societies so privileged. Briefly, the proposal made by the Council of the Royal Horticultural Society is that the Fellows of our Society should be permitted, upon presentation of their cards of Fellowship at any station (subject to a radius limit if thought necessary), to obtain a return ticket to London at the cost of a single fare upon any of the days upon which the meetings (shows) and lectures of the Society are held at the Drill Hall,

Westminster, and especially on the occasion of the Great Temple Show in the month of May. The Royal Horticultural Society has 3,500 Fellows, and it is believed that this number would be immensely increased (probably doubled) were the concession asked for to be conceded by the railway companies. The Royal Horticultural Society has also no less than 96 affiliated Societies, with a membership of probably quite 10,000 persons. Notwithstanding this, the number of Fellows and affiliated Members from the country attending the Drill Hall Shows rarely, if ever, exceeds 150 persons, while the Council is constantly in receipt of letters from the country Fellows of the Society intimating that they would gladly attend the meetings were such a concession as that now asked for granted by the railway companies. It is in consequence of repeated and persistent pressure from country Fellows to the above effect, that the present application is made. The Council are strongly of opinion that the railway companies would distinctly benefit by acceding to the request now tendered, and that a regular traffic would be created where one is now practically non-existent. In the case of affiliated Societies it might be stipulated that parties of not less than ten members must unite on each occasion in order to create the right to the concession; but this, and other matters of detail, would necessarily be settled in the light of the wide experience and practice of the railway companies in such cases. The Council hope that their proposal will receive the favourable consideration of your Board. I beg to inclose card showing the dates, &c., upon which the meetings of the Royal Horticultural Society are held this present year.

“I beg to remain, yours faithfully,

“W. WILKS,

“*Secretary R.H.S.*

“*March 8, 1898.*”

The replies were all to the same effect as the following:—

“London, Brighton, and South Coast Railway.

“*May 12, 1898.*

“Dear Sir,—In reply to your letter of March 8 last I beg to inform you that your application for cheap tickets to be issued to

members of the Royal Horticultural Society was recently considered at a meeting of the Associated Railway Companies and declined.

"I am, dear sir, yours faithfully,

"D. GREENWOOD."

SPECIAL PRIZES FOR DESSERT APPLES AND PEARS.

For Amateurs and Gentleman's Gardeners only.

THE VEITCH PRIZES FOR FLAVOUR.

With a view to the formation of a definite list of the best-flavoured varieties of British-grown apples and pears for dessert at all seasons, Messrs. J. Veitch & Sons, of Chelsea, in the summer of 1896 placed a sum of £60 at the disposal of the Council, who, in conjunction with the donors, drew up and sanctioned the following scheme, commencing with the Society's first meeting, in July 1896, and continuing till the last meeting, in June 1898, the Temple Shows only being excepted:—

SPECIAL RULES AND CONDITIONS.

1. No exhibitor may enter more than three distinct varieties in each or either class at each meeting.

2. Six fruits (neither more nor less) of each variety must be shown, the judges being at liberty to cut any three of them they please.

3. Every exhibitor must guarantee that the fruit he exhibits in these classes has been grown *entirely* out of doors. He should also state on the name card "Wall tree," "Bush," or "Standard," together with the aspect—north, east, south, or west—the nature of the soil; the county; and, when known certainly, the stock on which the tree is grafted.

4. The judges are requested to allot twelve points to a perfect dish of fruit—perfect in flavour, in quality, in appearance, and in size—distributing the points in the following proportions:—

For flavour	6 points.
For quality	3 „
For appearance	2 „
For size	1 „

By "quality" is intended the meltingness and smoothness (absence of grittiness) of the flesh, or (as, for example, in the case of early Apples) its crispness and juiciness.

By "appearance" is intended colour and beauty of outline and shape.

By "size" is intended such as invests the fruit "with the greatest value for table use." "Enormous specimens should not be preferred, as, beyond a certain point, size becomes a defect in dessert fruits." *Vide* R.H.S. Rules for Judging, &c., 1896 Code.

5. When several exhibits of the same variety are shown by several exhibitors, and the flavour and quality of two or more of them are found to be equal, the judges are directed in such case to award the prizes according to the demands of "appearance" and suitable "size."

6. The first and second prizes are not to be awarded to the same variety at the same meeting.

7. An exhibitor having won the first prize may not compete again during the year *with the same variety*, but the same variety exhibited by different exhibitors may take the first prize at any or all the meetings, and similarly with the second prize; nor may an exhibitor who has won a second prize take another second prize with the same variety; but an exhibitor having taken a second prize may take a first prize with the same variety at any subsequent meeting.

8. The prizes will be withheld if the fruits shown are considered wanting in sufficient flavour for dessert, or not fair specimens fit for table.

9. In all other respects the general rules will apply.

The following is a table showing the results obtained and giving all the varieties shown for these prizes, but only mentioning the names of the winning exhibitors:—

Date	Apples	Winner	Pears	Winner
1896				
July 14	—	—	Citron des Carmes, 2nd Prize only	O. Thomas
July 28	—	—	Little William . .	No Prize
Aug. 11	Irish Peach, 1st . .	O. Thomas	Jargonelle, 1st . .	W. King
	Red Astrachan, 2nd .	C. Browne	—	—
	Worcester Pearmain .	—	—	—
	Summer Queen . .	—	—	—
	Duchess of Oldenburg	—	—	—
	Cassell's Rosemana .	—	—	—
Aug. 25	Worcester Pearmain, 1st	C. Browne	Beurré de l'Assomp- tion, 1st	G. Norman
	Duchess's Favourite, 2nd	G. Wythes	Williams's Bon Chré- tien, 2nd	G. Wythes
	Devonshire Quarrenden	—	Doyenné Boussoch .	—
	Lady Sudeley . .	—	Beurré d'Amanlis .	—
	Irish Peach . .	—	Peach Pear . .	—
	Yellow Ingestrie . .	—	—	—
	Red Astrachan . .	—	—	—
	Kerry Pippin . .	—	—	—

Date	Apples	Winner	Pears	Winner
1896				
Sept. 8	Benoni, 1st . .	J. Powell .	Souvenir du Congrès, 1st	C. Herrin
	Worcester Pearmain, 2nd	C. Herrin .	Beurré d'Amanlis, 2nd	F. Harris
	Gravenstein . .	—	Williams's Bon Chrétien	—
	Kerry Pippin . .	—	Louise Bonne . . .	—
	Ribston	—	—	—
Oct. 1	Cox's Orange, 1st . .	H. C. Prinsep.	Thompson's, 1st . .	W. Cotterell
	Ribston, 2nd . .	T. W. Startup	Beurré Hardy, 2nd . .	W. Cotterell
	Worcester Pearmain .	—	Louise Bonne . . .	—
	Margil	—	Virgonia (Virgouleuse)	—
	Sir J. Banks	—	Welbeck Bergamotte .	—
	King of the Pippins .	—	Brockworth Park . .	—
	Scarlet Golden Pippin	—	Marie Louise	—
	Duchess's Favourite .	—	Fondante d'Automne .	—
	Gravenstein	—	Gansel's Bergamotte .	—
	—	—	The Popham	—
	—	—	Fondante de Thirriot.	—
Oct 13	Cox's Orange, 1st . .	G. Wythes .	Doyenné du Comice, 1st	C. Herrin
	Ribston, 2nd	C. Herrin .	Thompson's 2nd . . .	J. Powell
	American Mother, . .	—	Beurré Superfin . . .	—
	—	—	Marie Louise	—
	—	—	Duchesse d'Angoulême	—
	—	—	Seckle	—
	—	—	Fondante d'Automne .	—
Oct. 27	Cox's Orange, 1st . .	G. Woodward	Doyenné du Comice, 1st	G. Woodward
	—	—	Beurré Superfin, 2nd .	G. Woodward
	Ribston, 2nd	C. Herrin .	—	—
	American Mother . .	—	Beurré Diel	—
	—	—	Conseiller de la Cour .	—
Nov 10	Cox's Orange, 1st . .	J. W. Herbert	Beurré d'Anjou, 1st . .	C. Herrin
	Ribston, 2nd	G. Woodward	Knight's Monarch, 2nd	R. Maher
	Cornish Aromatic . .	—	Beurré Diel	—
	Fearn's Pippin . . .	—	Soldat Laboureur . .	—
	King of the Pippins .	—	Marie Louise	—
	—	—	Brown Beurré	—
	—	—	Glou Morceau	—
Nov. 24	Cox's Orange, 1st . .	C. Herrin .	Beurré du Buisson, 1st	W. H. Divers
	De Neige, 2nd	W. H. Divers.	Knight's Monarch, 2nd	O. Thomas
	Ribston	—	Beurré d'Anjou . . .	—
	Margil	—	Glou Morceau	—
	Blenheim Orange . .	—	Epine Dumas	—
	Lemon Pippin	—	Joséphine de Malines .	—
	King of the Pippins .	—	Winter Nelis	—
	Livermere Favourite .	—	—	—
	Melon Apple	—	—	—
Dec. 15	Cox's Orange, 1st . .	W. King .	Winter Nelis, 1st . .	J. Powell
	Blenheim Orange, 2nd	J. Powell .	Glou Morceau, 2nd . .	W. Cotterell
	Reinette du Canada .	—	Joséphine de Malines .	—
	Claygate Pearmain . .	—	Prince Consort . . .	—
	Lady Henniker . . .	—	Doyenné d'Alençon . .	—
	McLean's Favourite .	—	Bergamotte d'Espéren	—
	Mannington Pearmain	—	Nouvelle Fulvie . . .	—
	Ribston	—	—	—

Date	Apples	Winner	Pears	Winner
1897				
Jan. 12	Cox's Orange, 1st .	J. Powell .	Winter Nelis, 1st .	G. Woodward
	Blenheim Orange, 2nd	G. Woodward	Nec Plus Meuris, 2nd	O. Thomas
	Ribston Pippin .	—	Joséphine du Malines	—
	King of the Pippins .	—	Passe Crassanne .	—
	Lord Burghley .	—	Glou Morceau .	—
	Winter Peach .	—	Bergamotte d'Esperen	—
	Beauty of Hants .	—	Knight's Monarch .	—
	Adams' Pearmain .	—	—	—
	Margil .	—	—	—
	Cornish Gilliflower .	—	—	—
	Brownlee's Russet .	—	—	—
	Melon Apple .	—	—	—
	Spice Pippin .	—	—	—
	Fearn's Pippin .	—	—	—
Feb. 9	Blenheim Orange, 1st	W. H. Divers .	Passe Crassanne, 1st .	G. Woodward
	Scarlet Nonpareil, 2nd	J. Hudson .	Bergamotte d'Esperen, 2nd	O. Thomas
	Mannington Pearmain	—	Nec Plus Meuris .	—
	Claygate Pearmain .	—	Olivier de Serres .	—
	Sturmer Pippin .	—	—	—
	Pearson's Plate .	—	—	—
	Lamb Abbey Pearmain	—	—	—
	Barnack Beauty .	—	—	—
	Duke of Devonshire .	—	—	—
	American Mother .	—	—	—
	Fearn's Pippin .	—	—	—
	Hubbard's Pearmain .	—	—	—
Mar. 9	Cockle's Pippin, 1st	C. Ross .	Beurré Rance, 1st .	G. Woodward
	Adams' Pearmain, 2nd	G. Woodward	Bergamotte d'Esperen, 2nd	W. H. Divers
	Scarlet Nonpareil .	—	Nec Plus Meuris .	—
	Mannington Pearmain	—	Shobden Court .	—
	Pearson's Plate .	—	—	—
	Mottled Russet .	—	—	—
	Blenheim Orange .	—	—	—
	Ribston Pippin .	—	—	—
	Fearn's Pippin .	—	—	—
	Syke House Russet .	—	—	—
	Cox's Orange .	—	—	—
	American Mother .	—	—	—
	Hubbard's Pearmain .	—	—	—
	Claygate Pearmain .	—	—	—
	Sturmer Pippin .	—	—	—
	Newton Wonder .	—	—	—
Mar. 23	Allen's Everlasting, 1st	J. Powell .	Marie Guise, 2nd .	W. H. Divers
	Adams' Pearmain, 2nd	J. Day .	Bergamotte d'Esperen	—
	Scarlet Nonpareil .	—	—	—
	Rosemary Russet .	—	—	—
	Cox's Orange .	—	—	—
	Brabant Bellefleur .	—	—	—
	Blenheim Orange .	—	—	—
	Claygate Pearmain .	—	—	—
	Barnack Beauty .	—	—	—
April 13	Lord Burghley, 1st	C. Ross .	Chaumontel .	—
	Sturmer Pippin, 2nd	C. Herrin .	—	—

Date	Apples	Winner	Pears	Winner
1897				
April 13	Duke of Devonshire .	—	—	—
	Scarlet Nonpareil .	—	—	—
	White Nonpareil .	—	—	—
	Rymer .	—	—	—
	Dumelow's Seedling .	—	—	—
	Scarlet Russet .	—	—	—
	Claygate Pearmain .	—	—	—
	Brownlee's Russet .	—	—	—
April 27	Sturmer Pippin, 1st .	C. Herrin .	—	—
	Brandy Apple, 2nd .	J. C. Tallack .	—	—
	Claygate Pearmain .	—	—	—
	Hubbard's Pearmain .	—	—	—
	Court Pendu Plat .	—	—	—
	Baxter's Pearmain .	—	—	—
	Scarlet Nonpareil .	—	—	—
	Roi d'Angleterre .	—	—	—
May 11	Court Pendu Plat, 1st .	J. C. Tallack .	—	—
	Golden Reinette, 2nd .	A. J. Reid .	—	—
	Sturmer Pippin .	—	—	—
	Pine Golden Pippin .	—	—	—
	Old Russet .	—	—	—
	Ribston Pippin .	—	—	—
June 15	French Crab, 1st .	C. Herrin .	—	—
	Sturmer Pippin, 2nd .	J. C. Tallack .	—	—
June 29	—	—	—	—
July 27	Irish Peach .	—	St. Swithin .	—
	Devonshire Quarrenden .	—	—	—
Aug. 10	Lady Sudeley, 2nd .	G. Wythes .	Jargonelle, 1st .	G. Wythes
	Irish Peach .	—	—	—
	Devonshire Quarrenden .	—	—	—
Aug. 24	Irish Peach, 1st .	G. Wythes .	William's Bon Chrétien .	—
	Lady Sudeley, 2nd .	C. Herrin .	Jargonelle .	—
	Duchess of Gloucester .	—	—	—
	Worcester Pearmain .	—	—	—
Sep. 7	Kerry Pippin, 1st .	J. Mayne .	William's Bon Chrétien 1st .	C. Herrin
	Gravenstein, 2nd .	G. Wythes .	Dr. Jules Guyot .	—
	Worcester Pearmain .	—	Jargonelle .	—
	Oslin .	—	Early Rousselet .	—
	Devonshire Quarrenden .	—	Gratioli .	—
Sep. 21	Ribston Pippin, 1st .	G. Wythes .	Souvenir du Congres, 1st .	C. Herrin
	Worcester Pearmain, 2nd .	W. King .	Autumn Nelis, 2nd .	G. Wythes
	Cox's Orange .	—	Beurré d'Amanlis .	—
	Gravenstein .	—	William's Bon Chrétien .	—
	Maltster .	—	Gratioli .	—
	—	—	Louise Bonne of Jersey .	—
	—	—	Marie Louise .	—
Sep. 30	Ribston Pippin, 1st .	H. C. Prinsep .	Louise Bonne of Jersey, 1st .	G. Osborn
	Cox's Orange, 2nd .	C. Herrin .	Fondante d'Automne, 2nd .	W. Cotterell
Oct. 12	Cox's Orange, 1st .	G. Woodward .	Thompson's, 1st .	J. Powell
	Ribston Pippin, 2nd .	J. Powell .	Marie Louise, 2nd .	G. Osborn
	Gravenstein .	—	Seckle .	—

Date	Apples	Winner	Pears	Winner
1897				
Oct. 12	American Mother .	—	Doyenné du Comice .	—
	Charlestown Pippin .	—	Beurré Superfin .	—
	—	—	Beurré Bosc .	—
Oct. 26	Cox's Orange, 1st .	C. Herrin	Doyenné du Comice, 1st	J. Powell
	American Mother, 2nd	G. Woodward	Emile d'Heyst, 2nd .	G. Woodward
	Ribston Pippin .	—	Marie Louise .	—
	—	—	Brown Beurré .	—
	—	—	Comte du Lamy .	—
Nov. 9	Cox's Orange, 1st .	T. Turton	Emile d'Heyst, 1st .	G. Woodward
	Cockle Pippin, 2nd .	G. Woodward	Glou Morceau, 2nd .	G. Osborn
	Fearn's Pippin .	—	Doyenné du Comice .	—
	Ribston Pippin .	—	Marie Louise .	—
	King of the Pippins .	—	Zephirin Grégoire .	—
	—	—	Winter Nelis .	—
	—	—	Brown Beurré .	—
Nov. 23	Cockle's Pippin, 1st .	G. Woodward	Winter Nelis, 1st .	J. Crook
	Cox's Orange, 2nd .	— Bayford	Nouvelle Fulvie, 2nd .	G. Woodward
	Wyken Pippin .	—	Emile d'Heyst .	—
	Adams' Pearmain .	—	—	—
	Ribston Pippin .	—	—	—
	King of the Pippins .	—	—	—
Dec. 14	Adams' Pearmain, 1st	C. Herrin	President Barabé, 1st	W. Allan
	Cockle's Pippin, 2nd .	C. Ross	Winter Nelis, 2nd .	G. Wythes
	Cox's Orange .	—	Glou Morceau .	—
	Ribston Pippin .	—	Joséphine de Malines	—
	King of the Pippins .	—	Beurré Dubuisson .	—
	Stamford Pippin .	—	Nouvelle Fulvie .	—
	American Mother .	—	—	—
	Golden Pine .	—	—	—
	Lemon Pippin .	—	—	—
	Blenheim Orange .	—	—	—
	Fearn's Pippin .	—	—	—
1898				
Jan. 11	Margil, 1st .	J. C. Tallack	Joséphine de Malines, 1st	C. Ross
	Claygate Pearmain, 2nd	J. Powell	Passe Crassanne .	—
	Fearn's Pippin .	—	—	—
	Lemon Pippin .	—	—	—
	Ribston Pippin .	—	—	—
	Braddick's Nonpareil	—	—	—
	White Nonpareil .	—	—	—
	Cockle's Pippin .	—	—	—
	Egremont Russet .	—	—	—
	Adams' Pearmain .	—	—	—
	Reinette de Canada .	—	—	—
	Dutch Mignonne .	—	—	—
	Goodwood Pippin .	—	—	—
Feb. 8	Cox's Orange, 1st .	W. H. Divers	Passe Crassanne, 1st .	G. Woodward
	Calville Blanche, 2nd	G. Woodward	Beurré Bretonneau, 2nd	C. Herrin
	Court Pendu Plat .	—	Easter Beurré .	—
	Scarlet Nonpareil .	—	Olivier de Serres .	—
	Reinette de Caux .	—	Bergamotte d'Esperen	—
	King of Tomkin's County	—	Joséphine de Malines	—
	Fearn's Pippin .	—	Jean de Witte .	—

Date	Apples	Winner	Pears	Winner
1898				
Feb. 8	Lamb Abbey Pearmain	—	—	—
	Clapham Beauty	—	—	—
	Blenheim Orange	—	—	—
	Bess Pool	—	—	—
	Cockle's Pippin	—	—	—
	Old Nonpareil	—	—	—
	Lincoln Pippin	—	—	—
	Dutch Mignonne	—	—	—
Mar. 8	Cox's Orange, 1st	R. Bullock	Bergamotte d'Esperen, 2nd	R. Maher
	Bess Pool, 2nd	C. J. Salter	—	—
	Reinette de Canada	—	—	—
	Fearn's Pippin	—	—	—
	Scarlet Nonpareil	—	—	—
	Reinette de Caux	—	—	—
	Reine des Tardives	—	—	—
	Bess Pool	—	—	—
	D'Arcy Spice	—	—	—
	Sturmer Pippin	—	—	—
	Dutch Mignonne	—	—	—
	Court Pendu Plât	—	—	—
Mar. 22	Lamb Abbey Pearmain, 1st	J. C. Tallack	Nec Plus Meuris, 2nd	C. Ross
	Sturmer Pippin, 2nd	C. Herrin	Bergamotte d'Esperen	—
	Court Pendu Plât	—	Chaumontel	—
	Scarlet Nonpareil	—	Beurré Bretonneau	—
	White Nonpareil	—	—	—
	Mannington Pearmain	—	—	—
	Dutch Mignonne	—	—	—
April 12	Sturmer Pippin, 1st	C. Herrin	—	—
	Court Pendu Plât	J. C. Tallack	—	—
	Bess Pool	—	—	—
	Brownlees's Russet	—	—	—
April 26	Allen's Everlasting, 1st	J. Powell	—	—
	Hereford Pearmain, 2nd	R. Bullock	—	—
	Easter Pippin	—	—	—
	Suffolk Foundling	—	—	—
	Bramley's Seedling	—	—	—
	Northern Greening	—	—	—
May 10	Hereford Pearmain, 1st	R. Bullock	Beurré Bretonneau, 2nd	—
	Calville Rouge, 2nd	G. Woodward	—	—
	Claygate Pearmain	—	—	—
	Egremont Russet	—	—	—
	Calville Blanche	—	—	—
	Suffolk Foundling	—	—	—

JOURNAL

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VOL. XXII. 1898.

PART II.

INSECT "BLIGHTS AND BLESSINGS."

By Mr. FRED ENOCK, F.L.S., F.E.S.

[Read April 12, 1898.]

TIME is so very precious to all of us nowadays that we have great difficulty in paying much attention to things which we think do not concern our own interests. This is specially noticeable in floriculture, in which the demands of fashion compel horticulturists to produce flowers in, as well as out of season (mostly the latter), and the florist who can show the largest collection generally carries off the palm. This remark applies equally well to entomologists who amass large collections of specimens. A great deal more might be done if both would pay more attention to the habits and economy of insects, whose life-histories (if we omit Lepidoptera) are, comparatively speaking, unknown. I refer to such insects as come under the eyes of the horticulturist, and which generally fall between his finger and thumb or under his heel.

For years I have been studying, drawing, writing, and speaking of the life-histories of insects and the indisputable fact that is constantly brought home to me is our lamentable

ignorance. Now in the very short time placed at my disposal to-day I can only call your attention to a few of the insects which I have watched and carefully drawn or photographed from nature. The first of these shown upon the screen is a very small piece of a leaf from a Sycamore tree containing winged and wingless specimens of the Sycamore "Green Fly" (fig. 18). I really do not think a gardener *could* be found who was ignorant of the insects known as "Blight," or "The Fly," of

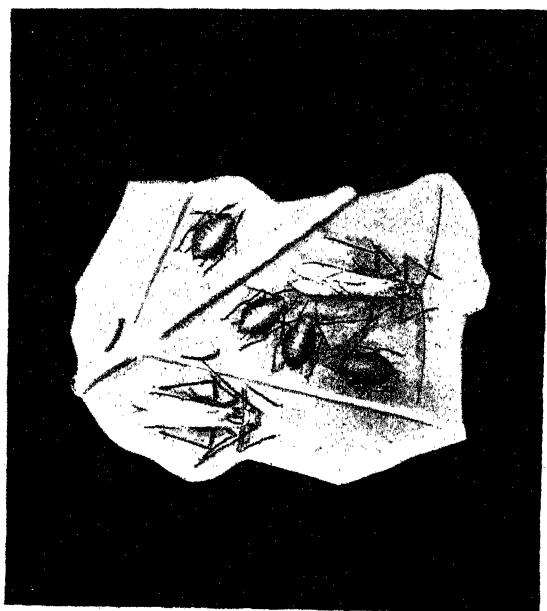


FIG. 18.

which there are hundreds of named species figured in British Aphidæ by Buckton; but even in our wholesale destruction of these a very little time spent in studying their habits would be of value, and enable us to distinguish valuable friends and helpers in the very camp of our enemies, where may be noticed white eggs of an oval form nesting between the ribs of the leaf: these are the eggs of the gardener's greatest friend. The Wasp Fly, or Hoverer Fly, belonging to the genus *Syrphus* (fig. 19), shows the maggot-like larva of this "blessing," which when

full grown is half an inch long, its body thickest at the tail end, gradually tapering towards the head, in which the mouth, formed much like a hook, is found. Attaching itself firmly to the midrib by means of its anal claspers, or "feet," the maggot moves its attenuated body about, swaying from side to side, much after the manner of a leech. I have frequently watched the emergence of these larvæ from the eggs scattered over the leaf, and sometimes, even before it has become clear of the egg-shell, its head has touched a Green Fly, which it immediately seizes and sucks dry. The flavour is so acceptable to its palate

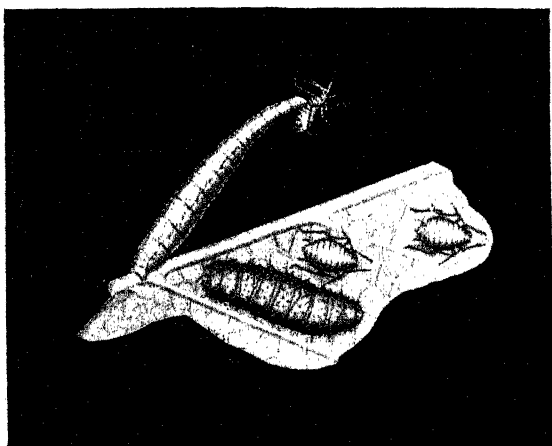


FIG. 19.

that for the rest of grub-life it feeds on nothing else. Its appetite is astounding: I have watched one specimen hoist up into mid-air (fig. 19) and suck dry over one hundred and twenty Green Flies in one hour. I look upon this as a record meal, but the number destroyed by one larva of Wasp Fly during its life of ten to thirteen days is simply prodigious. At the end of this time the maggot attaches its claspers to either a leaf or stem, where it undergoes its change to the chrysalis (fig. 20), the form and colour of which so much resemble a shoot that this protective resemblance preserves it from attack by birds. In a few days the matured Fly bursts forth from its shroud a living

and active Wasp Fly (fig. 21), and soon meets its partner, and again another batch of eggs is laid where Green Flies most do congregate. I consider it the bounden duty of every gardener to become acquainted with the Wasp Flies in all their changes, and to conscientiously avoid killing them.

Some of the Green Flies may even contain "blessings" in the

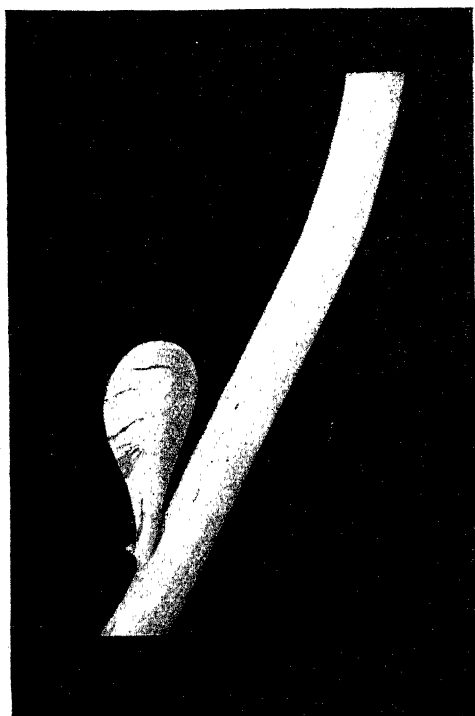


FIG. 20.

shape of minute parasitic Flies. One of these is shown at fig. 22. A little experience and patience will soon enable anyone to detect these very fat Flies, which generally lose their green colour, and attach themselves somewhat apart from their fellows, and gradually become of a dry appearance and brown or white in colour. From each of these emerge small four-winged Flies of different species, the most plentiful (*Aphidius*) being shown

at fig. 22. These and other allied species are in the habit of running about the green Flies, tapping them on the back with their long antennæ and sounding them to ascertain if they already contain a parasitic grub; if not a rapid leap is taken upon the back of one, and *volens volens* a hole bored through the skin and an egg of the parasite deposited in the stomach of the Green Fly. This egg soon hatches to a maggot which feeds upon the juices contained, and of course in due time destroys

the Green Fly, whose dried skin then forms a protection to the chrysalis of the parasitic Fly, which when mature bites a circular hole in the skin (fig. 23) and escapes to continue its species in due course. There is a large field open to anyone desirous of studying the parasitic Hymenoptera of the British Aphidæ.

If I did not know it to be a fact, I should not venture to say that the disease known as "The Black Currant Gall" is utterly unknown to a large number of gardeners having hundreds and

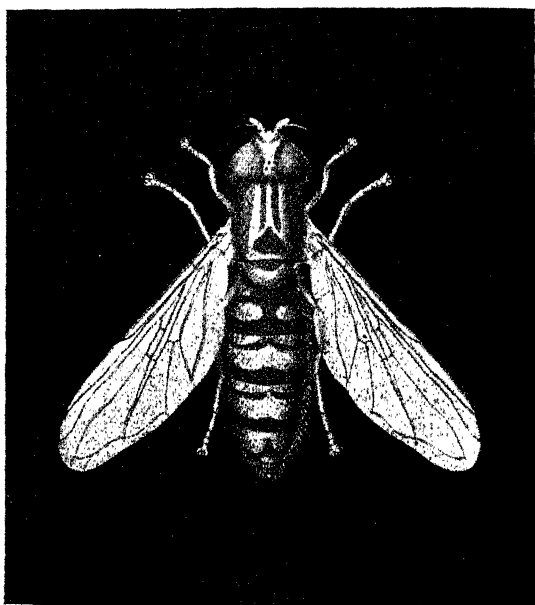


FIG. 21.

thousands of trees under their care; and yet every bush has been more or less affected, the common excuse for the scarcity of fruit being "Oh! the birds take them." It is not to be expected that gardeners should know the Gall Mite, which is but the one four-hundredth part of an inch long; but every gardener in Great Britain ought to know the "gall" itself—a sketch of which I give at figs. 24 and 25—a photograph of twigs showing innumerable galls of from a quarter to three-eighths of an inch in diameter, much resembling a hard-hearted cabbage.

It is of no use to dig the affected bushes up and throw them

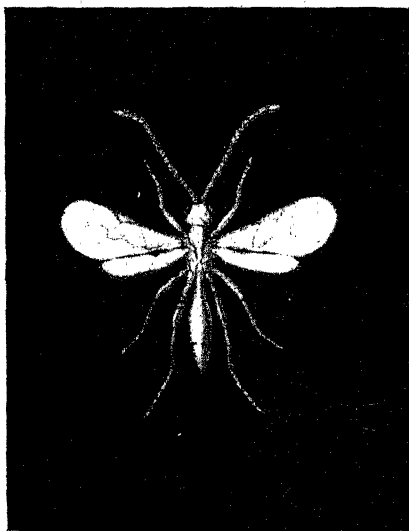


FIG. 22.

on one side; the only remedy is to carefully and systematically pick the galls off in, say, March or April and then religiously burn them. If combined action were taken by growers generally, there might be a chance of lessening this pest, which is causing such loss to the growers in Kent.

I had the pleasure of discovering the minute hymenopterous insect whose maggot feeds upon these Mites.

I have bred a large

number of these useful "blessings" from Currant galls, and I hold to the opinion which I expressed long years ago, viz., that in the hands of competent men these parasites might be bred in captivity in thousands. I suggested this plan in the case of the Hessian Fly parasite, and offered to send a number to the late Professor Riley (Government Entomologist of the United States of America) to try and introduce our British parasite (*Semio- tellus nigripes*) into the United States. I need scarcely say that my offer was imme-

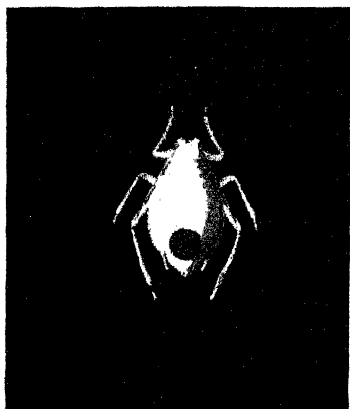


FIG. 23.

diately accepted, Professor Riley writing, "Send me a ship-load if you can." But I could not do that, so sent him a pill-box full, or about three thousand. These he carefully distributed to three of his entomological stations, and I had the satisfaction of hearing that a number had been successfully reared and apparently obtained a hold.

As an instance of what can be done in this way I have only

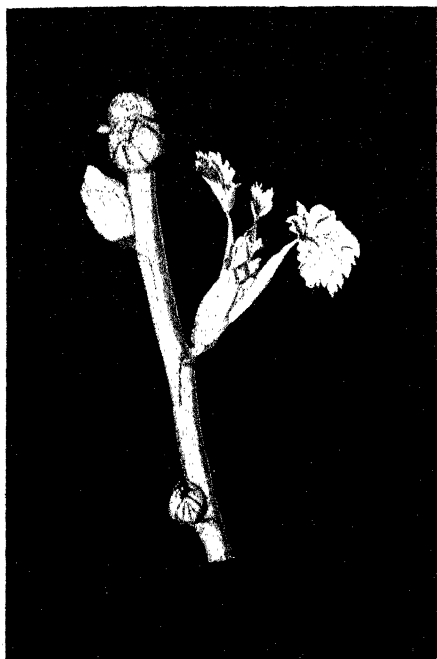


FIG. 24.

to again mention Professor Riley's most successful introduction of predaceous insects from Australia into the States for the purpose of destroying the Orange Scale insect. Such a work will long stand as a monument to Professor Riley, who was without doubt one of the greatest and most practical of economic entomologists ever known.

Fig. 26 shows a cluster of eggs, each of which is suspended at the end of a long silken thread. These belong to the Golden-

eyed Lace-wing Fly, another most useful insect, both as a Fly and also in the larval stage (fig. 27). Its habit is to lie almost flat to the leaf and spread its legs out like an alligator—in fact its waggling movement much resembles that of the alligator—and with its large curved jaws it snips up a large number of



FIG. 25.

Green Flies. When full grown it is barely half an inch long, and is of a greenish colour; its silken cocoon in which it changes to a chrysalis is about the size and form of a Sweet Pea, and is generally hidden away most successfully. Fig. 28 represents Hemerobius, one of the Lace-wings.

The old saying "Give a dog a bad name and hang him" might well be applied to the much maligned Devil's Coach-

horse (*Ocypus olens*) (fig. 29), for which most useful insect



FIG. 26.

few folk could be found to speak a good word. Well, according to some, appearances are against it; and the very idea of watching such a "horrid creature" is quite enough to stamp one a lunatic. I have frequently kept these proud, assertive insects, and have been much edified by watching their habits. Their valour is something to be proud of, and they are exceedingly proud, and—lacking a nose—they turn their tail up in the most graceful

manner. I have seen one with open jaws face a snarling kitten, and a too inquisitive dog of mine took the liberty of smelling one, with the result that it was sent away in fright, with the Devil's Coach-horse fast on his nose. All City men ought to be grateful to this "blessing," for its favourite food is the Cabbage Caterpillar, many of which it prevents from reaching a not uncommon resting-place for them, viz., the table. It is exceedingly fond of Earwigs, too; in fact many "pests" are kept in check by this noble insect.

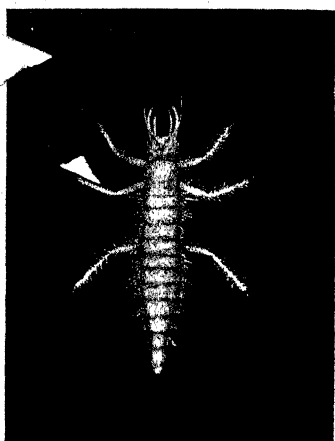


FIG. 27.

Time will not permit me to enlarge upon the many beneficial insects which horticulturists find in houses or gardens, and about

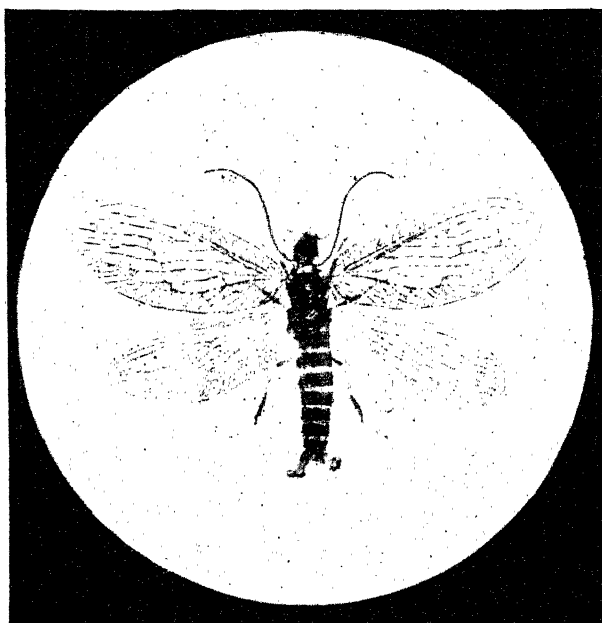


FIG. 28.

which they might give much interesting and useful information if they would endeavour to devote just a little time. I am sure that all entomologists would be glad to aid them in every way possible.

FRAGRANT LEAVES *v.* SWEET-SCENTED FLOWERS.

By F. W. BURBIDGE, Esq., M.A., V.M.H., &c.

[Read April 26, 1898.]

Farewell, dear flowers; sweetly your time ye spent,
Fit while ye lived for smell or ornament,
And after death for cures.—*George Herbert, "Life."*

INTRODUCTION.

LIKE most other natural things, the early history of perfumes, or odours, is deep down buried in the ages of the past. Still we

have good and reliable evidence to show that they were used by the earliest of civilised people on this earth, and we may believe that they were employed long before people were very highly civilised, since we find them used by savage tribes at the present day. History tells us that the Assyrians, Chaldeans, and Phœnicians, the Hebrews and Egyptians, the Greeks and the Romans, the Gauls and the Celts, and the Saxons all used sweet odours in some shape or form. By the same token we know that perfumes were used by the sturdy Normans and the crafty Moors: all had and used choice and rare perfumes on which



FIG. 29.

they set great store. The same is especially true of the early peoples eastward, as well as westward. Perfumes and savoury odours were used by Hindu and by Aztec alike; and if a full and true account of perfumes could be written to-day, I think we should be a little astonished at the great, and even tragic, parts they have played at times in the history of the human race. In Shakespeare's time old English gardens were rich in fragrant and aromatic herbs, many of which were highly valued in rural medicine. The growing and culling of herbs and simples, and their distillation, or formation into cordials

and potions, was carried on by wise and practical housewives and shrewd old village dames. Pomanders were made and given as New Year gifts; it was the day of sweet bagges and sweet waters, the materials for which came mainly from the garden or the field. Botany and medicine and chemistry were alike in their swaddling clothes. It was in the days of perfumed gloves and shoes,* &c.; of the "nosegay" and the "posy" rather than of the "bouquet."

Sweet odours and savours always held a place in nearly all religions, in all lands; and we have our incense of to-day. In Elizabeth's* time, and long before, houses and churches and even theatres were sweetened or purified by the burning of dried, or the strewing of freshly gathered herbs, English literature, from Lord Bacon to Lord Beaconsfield, from Gower and Spenser and Shakespeare to the days of Tennyson, is redolent of all the sweetest leaves and flowers of English gardens.

From China and India to Mexico and Brazil the learned have ever set a high value on perfumed things—from Buddha to Mahomet, and even later still. The cultured Brahmins have for ages hoped for and looked for the advent of a blue-flowered Champaca (*Mitchelia champaca*), just as our English gardeners have ever longed for a Blue Rose.

OLD RUSTIC CUSTOMS.

Old men have told me of the days when women placed sprigs of Costmary, Ladslove, Rosemary, and Lavender, with perhaps a flower or two, in their bosoms when they went to church in the stifling hot summer days, and the memory of such customs calls up a picture drawn in poesy by Ovid,† when he says: "Her hair is smoothed with a comb: now she decks herself with Rosemary, again with Violets or Roses, sometimes wears white Lilies, washes twice a day her face in springs that trickle from the top of the Pegasean wood; and twice she dips her body in the stream."

* Queen Elizabeth had an exceedingly fine nose, and loved perfumes; even her shoes were saturated with it; and she had a cloak of *peau d'Espagne* worth an enormous sum. Wherever the Virgin Queen visited, "the sweetynge of the house" was an important matter, and items of expenditure under this head are frequent in old records. This "sweetynge" was done by fresh flowers and herbs, by perfumed waters or spirits, and by the burning of fragrant substances.

† Ovid, *Met.* xii. 409-415. B.C. 43-A.D. 18.

When we look back a long way in the world's history, we may get a glimpse of those great primæval foundation stones—the five senses—on which all subsequent human intelligence and culture are superimposed. Since man first existed on the earth his nose has helped his eyes in the selection of his food, and this is a trait general to all the higher animals. If you give any of the larger apes some edible substance of which he has no previous experience, he at once tests it with his nose after seeing it, and by the nose—the sense of smell—very largely all the animals are guided; and we ought, I think, to cultivate this primitive instinct and be guided by it ourselves more keenly than we do.

At a very early period in man's history it would appear as though his senses, or instincts, and his reasoning powers were very unequally balanced, so that the senses often overpowered the mind. Savage man develops his brain mainly through the exercise of his senses; but a cultured man of to-day prides himself on his self-abnegation or altruism, and so his senses are developed and educated only under the brake-power influence of his brain. In a word the senses are very apt to say to us, "It is a lovely morning; let us go out and shoot something"; but our higher mental nature whispers, "No! Let us try to make all beautiful living things as happy as we can." Remembering this dual nature in ourselves, the conflict between the animal instincts and our reasoning powers, I think you will see that it is extremely probable that men and women of old were led to enjoy and use sweet-smelling natural products instinctively long before they could perceive any sanitary value in perfumes.

So much, then, for the early history, and you will naturally ask me what I have to say about sweet-scented leaves. Well, my object to-day is to try and persuade you, and all gardeners, to place a higher value on sweet-smelling leaves than even some of you do already. I want you to rate all fragrant foliage quite as highly as you now profess to value sweet-scented blossoms. I also wish to point out some of the essential differences, and advantages, even of foliage leaves, as opposed to those floral leaves we call flowers. I am also particularly anxious to try and show that there is a sanitary basis, rather than a merely sensuous reason, for the usage of sweet odours and vegetable perfumes, whether the same be fresh or dried, living, dead, or distilled.

Modern researches have amply proved that ozone is developed when the sun shines on most kinds of fragrant plants, such as flowers, fir and pine trees, and sweet herbs generally.

WHAT IS ODOUR OR PERFUME ?

Now let us ask ourselves what odour or perfume really is. I asked a very celebrated chemist this question the other day, and he said frankly that odour, like electricity and many other things, was a very subtle and "unknown quantity," and that no one knows absolutely and precisely what it is, nor why one odour should please us, and actually invigorate or stimulate us, while another disgusts us so much that we sometimes call it by another name. Odour seems a product given off by the action of oxygen on essential oils—a vapour being evolved under certain physical conditions of heat, moisture, or pressure, and even light and darkness now and then have some share in its evolution.

LEAF ODOURS *versus* FLORAL ODOURS.

When we compare leaf odours with flower odours we find a considerable difference between them. Thus in the case of the orange there is a difference between the essential oils of the flowers and of the leaves, and of that of the rind of the fruit, which afford three different kinds of perfume.

Then floral odours are generally positive, being exhaled by most flowers spontaneously as it were, so that you must inhale floral odours whether you like them or not.

Leaf odours, on the other hand, are latent or negative, and are rarely to be detected except after the leaves have been touched, pressed, or bruised. Both leaf and flower perfume depends on the same essential oil being in different states or conditions.

Floral odours again are emitted only at particular times, that is to say, just when the androecial whorl attains maturity, and the flowers are quite fresh ; and even then, in the case of many Orchids and other flowers, their scent is intermittent, and only to be perceived at different times of the day or night—this time, as we suppose, having some connection with the diurnal or nocturnal visits of the insects that act as marriage priests in their native wilds. But, on the other hand, leaf odours are per-

sistent—"ready if sought" seems to be their motto—and not only are scented leaves fragrant when green and fresh, but often retain their perfume long after they are yellow or brown and sere. Mr. Hudson, of Gunnersbury, to whom I am indebted for a collection of scented *Gerania*, &c., to-day, tells me that the old yellow or brown leaves of these charming plants are sweeter even than the fresh ones. This is doubtless owing to the water of the leaves having evaporated, thus leaving behind the essential oils in a more concentrated form. This permanency of odour is a strong recommendation, and no greenhouse or conservatory or boudoir need be wanting in delicate perfume if plenty of sweet-leaved plants are grown.

PERFUMES, VARIOUS, HEALTHY OR INJURIOUS.

Somebody has said that the whole world is divided into those people who like dogs and horses and those people who dislike horses or dogs. Well, it is somewhat similar in the case of perfumes. Some folks enjoy them, while others say that they dislike them; and to some few people, especially to vocalists, some particular perfumes are actually not only repellent but injurious. This is even true in the world of animals and insects, as we all well know. Thus cats love Cat-mint, Valerian, and *Nemophila*. Dogs like *Chenopodium Vulvaria*.

Nearly all cattle love Fenugreek in their food or forage. The perfume of Lavender, Rosemary, Cloves, Cinnamon, or Camphor is most deterrent or offensive to moths; hence we constantly use them in our linen closets or drawers and wardrobes in which furs &c. are stored. In the tropics I found that Camphor-wood chests were the only receptacles (other than close-fitting tin cases) that defied the ravages of the termites, or so-called white ants; and even the hungry mosquito may be kept at bay by torches composed of Dammer-gum and Camphor combined. So we see there are two sides to the shield—two sides to the perfume question mostly attractive, but sometimes deterrent or repellent to both mice and men. Nor need we wonder at this when we observe how widely dissimilar men really are. Socrates objected to perfumes, and that may have been the reason Xantippe objected to him. Can you imagine William of Normandy or Oliver Cromwell or John Knox with scented handkerchiefs? Of course not. Nor can you imagine Charles II.

or Elizabeth or Mary Queen of Scots without one. The spice-box was a great institution on the hall table in mediæval times. "If you can't sit above the salt sit close to the spice-box" is an old proverb, *i.e.* in any case do the best you can.

THE FIVE SENSES.

Let us devote just a minute to the gateway arch of all human knowledge—the five primary senses. (1) We begin with *touch* or feeling because that is the mother sense, as it were, of all the others. To the young of all animals touch means warmth and food. You may have noticed the milky eyes of a new-born baby staring at nothing; but if it grasps you with its tiny hand you will have some notion of its great strength of grasp out of all seeming proportion to its age and size.

(2) *Taste* runs touch very closely, and is perhaps really compounded of touch and smell, because if you close your eyes and nostrils firmly, so as not to see, or get any flavour or aroma of what you are eating or drinking, you cannot really tell what your food or drink may happen to be. I remember learning this fact very early in life. My grandmother always thought my mother quite incapable of managing her own baby, and having an extensive knowledge of rural medicine she used to practise upon me to her dear old heart's content. Most herbal remedies I could drink off without faltering, but I drew the line at castor oil. Hence the old dame used to hold my nose tightly whilst she poured it down my throat.

(3) *Smell* I place third on the list because it often seems to come before sight in animal evolution. Puppy dogs find their mother by touch or scent long before they can see, as is well known. Of all the senses it is, so far as animals are concerned, one of the very first importance. In the tropics, monkeys and bats alike hunt by scent rather than by sight. This is especially true of the fruit-eating animals and birds. Vultures, condors, and other carrion-eating birds, and some fishes, sharks, &c., by scent detect their food at distances that would seem incredible did not travellers agree in their testimony. With insects generally the sense of smell is extremely acute, as all entomologists agree in telling us; and although Sir John Lubbock's well-known experiments proved beyond question that insects see colours, and prefer blue to red, and red to yellow, yet it remains

true that insects rely mainly on odour in their search for food or for each other. The sense of smell is perhaps of all our senses that least under our own control. It is of all others the most subtle and most difficult to regulate, or measure, or define. We may to some extent actually avoid touching, seeing, or tasting, but, alas! our ears and our noses cannot often be prevented from the disagreeable sounds or odours that surround us. All the senses are mnemonic, but none are so potent in recalling persons, scenes, or places as in the sense of smell. Sound may be analysed and set down as in music; colour is simplified and can be arranged in methodical form; but, despite the crude attempt of the late Dr. S. Piesse in his "Art of Perfumery," it yet remains for some specialist in odours to give us a gamut or scale, so to speak, of the thousand and one subtle whiffs of fragrance, or the myriads of odour waves that so often bombard the delicate nerve centres that lie under the mucous membrane inside our noses. Children are often taught that it is rude to smell their food before eating it, and yet there are times when the primitive nose test might save them and ourselves from many dietetic troubles. Experts in selecting the best solid and liquid food products use their noses as well as their eyes with the best results, and the subtle art of smell and power of diagnosing things by nose power is well worth developing to its fullest extent.

BLEND, BOUQUETS, OR MIXED PERFUMES.

Bouquets, melanges, or particular blends of perfume are easily made pretty much as a florist arranges flowers, or an artist his colours; but the late perfumer Dr. S. Piesse pointed out that to make a proper bouquet of primitive odours the kinds so used should agree or correspond with a scale or gamut, just as do the musical notes. Dr. Piesse goes so far as to say that one false note amongst odours will destroy the whole harmony of the chord, just as in music or in colour. His odophone, or scent scale, for chord of C is as follows:—

Santal is C bass, 2nd line below.

Geranium is C bass, 2nd space.

Acacia is E treble, 1st line.

Orange flower is G treble, 2nd line.

Camphor is C treble, 3rd space.

ANOSMIC OR HYPEROSMIC PEOPLE.

We have often heard of people who are wholly or partially blind to colour; and there are also anosmic people, who have wholly or in part lost the sense of smell; and there are some people who possess a sharp sense of smell who nevertheless cannot detect some few particular odours. In contrast with the anosmic folks we find a set who are decidedly hyperosmic—they “smell a rat” very quickly, and are often rabid about sewers and other sanitary matters. These acute-nosed people make excellent perfumers, and to their ranks belong the best and most successful buyers of such products as wine, tea, hops, drugs, perfumes, tobacco, coffee, and spices: they form their judgments through the nose just as accurately as do the dealers in jewels and pictures and artistic objects generally by means of their sharp eyes.

HYPEROSMIC SKILL OF EXPERTS.

A clever perfumer can readily detect any special odour as used in the so-called “bouquets” of the scent dealers. To do this he pours out a little of the spirit which holds the perfume and rubs it in the palm of his open hand. The alcohol evaporates with the warmth, and the scent is left comparatively pure. All the principal odours, such as violet, rose, jasmine, or musk, are easily detected, but an expert will analyse a liquid in which three or four perfumes are blended together and give the relative proportions of each one used simply by this primitive nose test; a fact which shows how perfect our senses may and do become when practically educated by the help of our brains.

SCIENTIFIC NEGLECT OF ODOUR.

It is curious to note how careful botanists have been to tell us the shapes of leaves and the arrangement and number of sepals, petals, and stamens of flowers; while in the great majority of cases such vital matters (to the flowers and ourselves) as colour and perfume have been totally ignored. Nowadays, however, we are all most anxious to know not only what plants are, but more especially what they do, and how they do it. We are beginning to perceive that colour and perfume are quite as essential as are the organs that produce them; that

physics and physiology must be studied together, since the end is greater in importance than are the means.*

4. *Sight*.—It is a sad thing to lose one's sight, and yet the blind have many compensations; and it is a well-known fact that, other things being equal, the senses of touch and of hearing and of smelling, and consequently of tasting, are very much improved.

One object I had more especially in view in preparing this paper was to advocate the growth of sweet-scented flowers, and especially sweet-scented hardy flowers and foliage, in or around all of our institutions for the blind. This is no new gospel, since the late Miss Frances J. Hope, of Edinburgh, inaugurated the giving of sweet-smelling leaves and flowers to the blind of her native city long before even ordinary Flower Missions were begun and carried out elsewhere. She used to say, "Give what flowers and leaves you like to your sharp-eyed friends, or the poor who can see; but it is almost an insult to offer a blind pauper a gaudy flower without a perfume." Miss Hope was one of the first to observe and record the fact that blind people almost invariably touch or feel the flowers before they sniff at them. Miss Hope was a woman of intellect and mettle, and one can fancy or imagine her indignation when some candid friend suggested that "a bottle of perfume would go farther, and last longer among her blind friends, and so save her from 'wasting flowers on the blind,'" and thus enable her to keep the flowers for the seeing sick and poor!

5. *Hearing or Sound*.—On our power of hearing depends all enjoyment of music, bird song, and other sweet sounds. Even speech itself, that master key of the human race, depends to a great extent on our power of hearing, though speech may be seen by the deaf just as writing is felt by the blind. Of hearing, however, we need say no more, since it has practically nothing to do with our present subject.

CLOSE INTERCONNECTION OF THE SENSES.

But we may just glance at the connection that exists between the so-called five senses, our instincts as opposed to our reason.

* The great Swedish naturalist Carl Linné, indeed, did pay some attention to plant odours, which he roughly divided into seven groups, or classes, three only of which were pleasant, viz. the aromatic, the fragrant, and the ambrosial. Linné also called the night-scented flowers *floræ tristes*, because generally of a dull green or brownish hue.

Touch and taste are intimately connected, and both taste and smell together form what we call flavour, aroma, or bouquet.

So also we like to connect seeing and hearing at the opera or theatre or concert, nay, even at lectures, where we call in the aid of lantern slides or diagrams when actual things themselves are not available. Some day we shall be able to show you different odours on the screen, and I am sorry that I cannot so show you some of them to-day.

Sight, taste, touch, smell, and hearing have all been gratified at once from the earliest civilised times in all countries.

Things "pleasant to the eye and good for food" have always been an attraction since the days of Eden, and are sure of a ready sale in our markets of to-day. But, after all, the primitive senses, noble as they are, are not everything. Even our very highest sensual education is merely instinct, and instinct is a blind and unreasoning expression of animal feeling: "Man cannot live by bread alone"; "Let him who hath two loaves of bread sell one and buy flowers of the Narcissus, for bread is food for the body, but Narcissus is food for the soul." Feed a man as you will; clothe him in fine linen, purple, and gold; give him wine and music and all other luxuries, and he will ask for "the feast of reason and the flow of soul." He will ask you for brotherly sympathy and human fellowship, for "a temple not made with hands."

FLOWER ODOURS POSITIVE; LEAF ODOURS NEGATIVE.

Flower perfumes, as we have said, are positive, being mostly given off whether we like it or not, and some people are so extremely sensitive to perfumes that those of Hyacinths, Narcissus, some Lilies (especially *L. auratum*), and even Roses prove disagreeable, and at times actually injurious. We are told that "one dog's meat is another dog's poison," and floral odours that delight some people prove extremely disagreeable to others; and though "aromatic pain" of this kind may not actually kill folks it is none the less a nuisance for the time it must be endured. To all those who suffer from strong floral perfumes I can strongly recommend the more negative qualities of fragrant leaves.

SMEE'S PLAN OF CONDENSING FLORAL ODOURS.

A very easy method of obtaining any special natural flower or leaf odour is described and illustrated in "My Garden" (Smee),

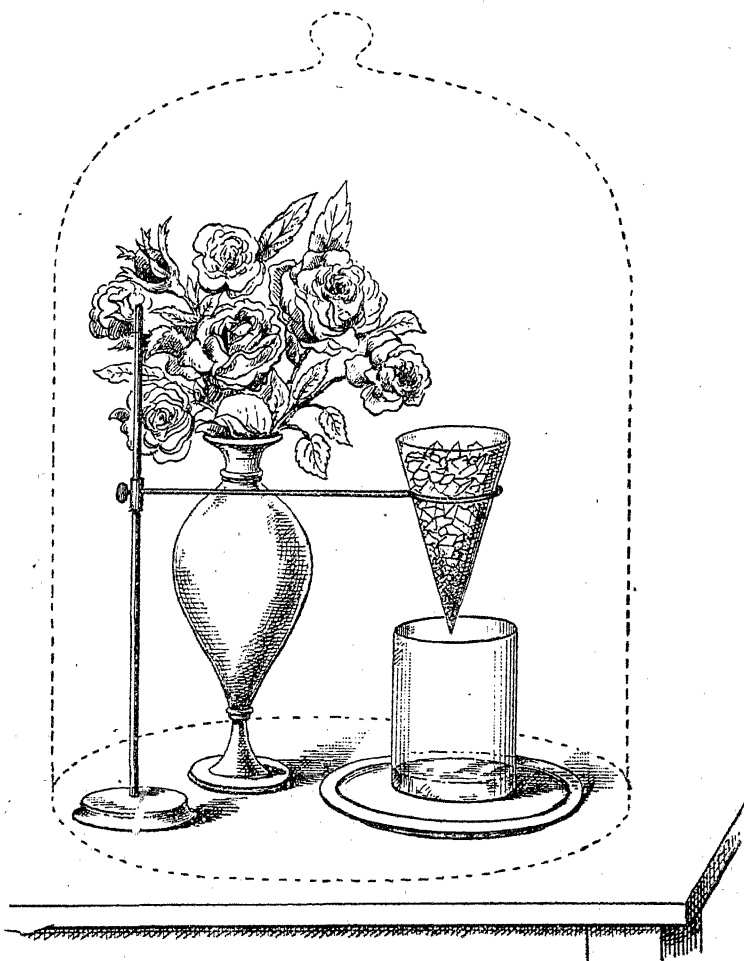


FIG. 30 THE APPARATUS FOR CONDENSING PERFUME FROM FRESH FLOWERS.

p. 227 The apparatus (fig. 30) consists of a glass funnel with its narrow end drawn to a point, and filled with a mixture of lumps

of ice and salt, by which a very low temperature is obtained. The funnel, on a retort stand, and a small phial or other receptacle below, is placed near flowering plants of Roses, Jasmine, Pinks, or Mignonette, &c., and the odour or odours evolved, together with moisture, are condensed outside the funnel and trickle down into the vessel below. Cut flowers may be used and the whole covered with a bell glass as here shown. The perfumed water thus obtainable is very pure and perfect when fresh, but soon becomes sour unless alcohol is added. In this simple way any essential perfume is readily obtainable, and people may thus make and enjoy the sweetness of their own flowers.

Another simple way of obtaining and fixing perfume from fresh flowers is to gather them dry when at their best and throw them into a wide-mouthed bottle or jar half full of olive oil. If many mixed flowers are used the result will be a millefleurs, or mixed bouquet (*melange*). After soaking about twenty-four hours take out the flowers and squeeze them into a horse-hair bag, letting the oil run back into the jar. Repeat this operation until the oil is saturated with perfume, when it can be mixed with an equal quantity of deodorised spirit or alcohol, and should be shaken up every day for a fortnight; after which the spirit may be poured off quite clear, and will be highly charged with perfume that was originally absorbed by the oil. Of course perfumes, like jams and preserves, can be bought cheaper than they can be made at home; still some may like to prepare their own supplies from their own garden all the same.

Another way is to extract the odours of scented petals by *effleurage*. The flowers are thrown into clean fat in shallow earthenware or glass vessels. Mix up the fat and the flowers and keep on adding flowers or scented petals from time to time, and when the fat has absorbed the perfume it may be dissolved out with pure alcohol, as in the case of the oil method.

Pretty Oriental jars with close-fitting covers may be three parts filled with dry fresh petals of Pinks, Cloves, Carnations, or Roses; then add the rinds of two or three lemons (cut thin), an ounce of orris-root (powdered), half a pound or more of bay salt, one ounce of benzoin (powdered), ditto cinnamon, ditto cloves, ditto nutmeg (powdered), one grain of musk, ten or twelve sweet bay leaves, and one ounce each of eau de Cologne, lavender water, and

bergamot, with a few sage leaves and rosemary and lavender cut small; keep in pretty jars and add lavender water if it becomes too dry.

THE STUDY OF VEGETABLE ODOURS.


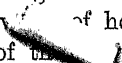
I do not know of any other subject so worthy of study as this intricate one of odours or perfumes. We ought to educate our noses better than we do. The nose is really a sensitive organ, placed as a sentinel at the very entrance or gate-house of the lungs; and if our noses are not alert and faithful we lay ourselves open to all sorts of diseases or ills that flesh is heir to. The odours or essential oils of plants are essentially antiseptic, and the wonder is that pathologists have neglected their health-yielding virtues so long. We have had Pfarrer Kneipp with his wonderful water cure; we have had the grape cure; and I hope soon that some clever specialist will start a hospital or "scent cure," in which sweet odours will play a part not inferior to other medicants that act only on the stomach, and leave the lungs to do the best they can alone.

PERFUMES AND TEMPERATURE.

The late Professor Tyndall made a series of very elaborate experiments as to the absorption of heat by odorous vapours. Their action is enormous in this direction as compared with that of pure (*i.e.* unscented) atmospheric air; and it was found that the least energetic of the odours employed, *viz.* patchouli, had thirty times the cooling effect of fresh air, and that of the most energetic, *viz.* cassia, had actually 109 times the effect.

Perfumes	Absorption per 100	Perfumes	Absorption per 100
P. tchouli	30.0	Lavender	60.0
Santal	32.0	Lemon	65.0
Geranium	33.0	Portugal	67.0
Oil of Cloves	33.5	Thyme	68.0
Attar of Roses	36.5	Rosemary	74.0
Bergamot	44.0	Oil of Laurel	80.0
Neroli	47.0	Cassia	109.0

FLORAL AND LEAF ODOURS ANTISEPTIC.

One good effect gained by diffusion of perfumes by the burning of fragrant herbs, or gum resins, in the hot and too often stuffy  of hospitals in summer time would be the banishment of  that too often fret and irritate the restless

sufferer. Then we might adopt with advantage over the doors and windows of hospital or sick-room alike the perfumed curtains or awnings of fragrant grass called "cuscus tatties" in the East. These are now and then sprayed with water from a syringe, and the evaporation or the grateful odour, or perhaps both, cools and sweetens the room at the same time. Mrs. Earle, in that charming work "Pot-pourri from a Surrey Garden," tells us she places dried leaves of Verbena, Lavender, and sweet-scented Geraniums in bags, and places them under and behind the cushions of her chairs, much to the enjoyment of her visitors, who wonder from whence the delicate perfume comes. In the East it is a common practice to place bags of lime, or orange leaves and lemon-grass under the mats near the doors, so that the pressure of each one entering aids unconsciously in perfuming the rooms. In Borneo I saw the girls of the villages wrapping or coiling their glossy black hair well oiled around Jasmine or Champac flowers, so that by this personal enflourage their coiffure was a sweet one next morning. I believe also that by their thus perfuming themselves they to a large extent escape malarial fevers, so common in low-lying tropical regions.

BENEFIT OF PERFUMES FOR BURNING.

Professor Mantegazza, of the Institute of Lombardy, long ago pointed out that the burning of perfumes or incense, such as benzoin, in sick-houses, or hospitals, or churches was a practice based on common sense. If this burning merely disguised or masked insanitary odours, we might not reap much material benefit by the practice. But the burning creates or assists ventilation and oxidation, and then acids are produced that neutralise the effects of bacteria or of foul air, while the aromatic fumes given off are inimical and preventive of infection, being often fatal to bacterial life.

ESSENTIAL OILS *versus* BACTERIA.

Those who wish to go further afield in their inquiries as to the beneficial influence of essential oils *versus* bacteria should consult Sternberg's "Text-book of Bacteriology," p. 199 *et seq.* Professor Chamberlain has made extensive experiments in order to prove the antiseptic powers of the vapours of volatile vege-

table oils. A large number of the essential oils tested did actually prevent the development of the anthrax bacillus; while, on the other hand, a few of them did not do so. At the end of six days the culture tubes containing the bacillus and the oil were opened, and the oil which had been absorbed by the culture liquid allowed to evaporate. Living cultures were again obtained from all except the following, which it was inferred had destroyed the vitality of the bacillus and its spores or divisions. The essential oils that did this were Angelica, Cinnamon of China, Cinnamon of Ceylon, Geranium of France, Geranium of Algeria, and Origanum. In the case of the typhoid bacillus the essences which killed its germs after a contact of less than twenty-four hours were as follows:—

GERMICIDAL POWER OF ESSENTIAL OILS.

Cinnamon of Ceylon, at the end of 12 minutes.

Cloves,	“	“	“	25	“
Engenol,	“	“	“	30	“
Thyme,	“	“	“	35	“
Thyme, Wild,	“	“	“	45	“
Verbena of India,	“	“	“	45	“
Geranium of France,	“	“	“	50	“
Origanum,	“	“	“	75	“
Patchouli,	“	“	“	80	“
Zeodary,	“	“	“	2 hours.	
Absinthe,	“	“	“	4	“
Sandal-wood,	“	“	“	12	“

ESSENTIAL OILS AS ANTISEPTICS.

Professor Riedlin reports, as to the results of his experiments, that the essential oils which have the greatest antiseptic value are “oil of Lavender, Eucalyptus, Rosemary, and Cloves. As to Eucalyptol its efficiency as an antiseptic has been popularly much overrated.” Thus Chabannes and Perret found a 5 per cent. solution had no effect whatever on tubercle bacilli in sputum; and, according to Behring, Eucalyptol is about four times less active as a disinfectant than is carbolic acid.

ARTIFICIAL OR CHEMICAL PERFUMES.

Apart from animal perfumes such as musk, civet, castor, and ambergris, and the vegetable odours derived from flowers, leaves,

roots, fruits, or seeds, there are a few purely chemical perfumes, such as nitrobenzol, attar of mirbane (or false almond), vanillin (or methyl-protocatechnic aldehyde), coumarin (or coumaric anhydride), and a few others, such as "hemerocalle," "bro-melia," "aubepin," &c., not as yet much used or sold. Tielman and Hermann, in Germany, first made "vanillin" from pine-tree sawdust; and Dr. C. R. Alder Wright afterwards made it from crude opium. The chemical "vanillin" is forty times stronger than the natural product, and is worth about 23s. per oz. Coumarin (Tonquin-bean odour) is also now made chemically, and costs about 9s. per oz.

MARKET VALUE OF SWEET FOLIAGE.

To come to trade matters, I believe a good business could be done in hardy, fragrant, and durable foliage as opposed to flowers. I am told that there is always a good demand for all kinds of sweet pot herbs in our great city markets, either fresh or as dried; and I can well believe the statement that the supply of good foliage or greenery falls short of the demand, although there are generally plenty of flowers. The cook, the doctor and druggist, and the makers of wines, liqueurs, and cordials, and floral decorators owe much, and might owe much more, to fragrant foliage and to agreeably flavoured herbs. In Elizabeth's days the "herb woman" was a necessary addition to the servants of the fine old country houses, and there is some reminiscence of her and her duties lingering around the English Court to-day.

I believe all pleasant odours are harmless, and very often they are actually beneficial. On the other hand, whilst many disagreeable odours may be harmless, but few of them do us any good, and some of them carry the germs of dire disease, and often prove a scourge to the human race. Beau Brummell used to insist that no man of fashion in his day should use perfumes, but that he should send his linen to be washed and dried on Hampstead Heath.

FLOWER OR SCENT FARMS.

There are scent-producing flower farms in several of our British colonies, in South Africa, in Australia, and Colonel Talbot has obtained some success in Jamaica. The finest Peppermint, Lavender, and Thyme, &c. has for many years been grown at Mitcham, in Surrey, and there is plenty of land

suitable for this industry in Kent, Surrey, and elsewhere in the South of England. The great European flower farms for perfumery uses are, however, in the valley of the Var, a great triangular space of 115,000 acres, with Grasse at its apex and Nice and Cannes at each corner of its base on the Mediterranean. The flower, leaf, and fruit-rind harvest on this tract is a very large one, and the various odours are roughly prepared on the spot by maceration, distillation, enfleurage, or simply by expression, according to kinds and quality required.

STATISTICS OF FLOWER CULTURE IN THE VALLEY OF THE VAR.

Flowers, &c.	Weight in Tons	Harvest Time
Orange flowers	1,800	20th April to 31st May.
Roses	930	15th Jan. to 15th April.
Violets	147	20th July to 10th October.
Jasmine	147	Aug., Sept., and Oct.
Tuberose	74	"
Cassia	30	Oct., Nov., and Dec.
Jonquil	15	February and March.

BEAUTIFUL FLOWERS WITHOUT SENTIMENT.

When we go to visit the royal and noble gardens in England, what do we often find there? You will find the most exquisite of tropical Orchids and other exotics in damp, warm greenhouses. You will be satiated with exquisite flower, form and colour, and perfume. For, after all (and I hope the Orchid growers will forgive me, for I am an old Orchid collector and grower and lover myself), Orchids are, in a sense, what dear old Parkinson called "outlandish flowers"—flowers having, like Leigh Hunt's coryphées, "exquisite bodies but no souls." No sentiment lingers around them, no sweet old-fashioned legend or tradition; their perfume even is borrowed, as it were, and not their very own; and we may be said to admire them rather than to love them, and when satiated with their beauty we turn to the dear old Cloves, Carnations, Pinks, Roses, Violets, Musk, and scented-leaved Geraniums (Pelargoniums) of our grandmothers' gardens—things primæval, as it were, that peer and peasant, rich and poor alike, can grow and admire. Artemus Ward used to say that modern English authors would have had a good opening if the early poets and Shakespeare had not said all the good things before their time; so that we

must not blame the Orchids too much, since botanists and geologists agree in telling us that they are the most modern of all flowers—Nature's last bit of floral patchwork or mosaic—formed of the shreds and patches of older things.

THE GREEN LEAF AS A CHEMICAL LABORATORY.

Let us now ask ourselves what the odour-distilling green leaf as a chemist does for us. Well, it works whilst we are resting, as well as when we are awake. "Be aye stickin' in a tree Jock: it'll grow while ye're sleepin'," is a well-worn Scotch proverb. But the green leaf does more than the chemist can do in his finest of laboratories. It can turn sugar into starch (as well as starch into sugar); it can bring forth life out of dead matter; and these are things no chemist as yet can do. When we ask ourselves what the green leaf does for us, the answer would seem miraculous had we not got used to accepting its products as a mere matter of course—timber for the builder's yard, corn for the granary, flowers and sweet leafage for the bride's chamber, moss for the grave. The green leaves feed the cattle, the flocks and herds on a thousand hills. They give corn and wine and oil to the teeming millions of our little sphere. Every green leaf is a chemical laboratory, acting like a dynamo under the power of sunshine and fresh air; a still-room in miniature distilling for our needs the most potent of health-and-strength-yielding products.

It seems a hard saying, perhaps, but it is quite true, that the aroma and flavour of our food, our wine, the very "milk and honey" of our lives, is primarily dependent on "nothing but leaves." Perfumes of flowers and leaves enter into all our relations with life and love and death. Nero burnt more than a whole year's produce of spices and perfumes from Arabia on the pyre of his favourite wife and empress Poppæa.

Sweet leaves are like our five senses, potential for good, and like them rich in promise, for to green leaves alone is due every good gift that we value and enjoy from the vegetable world.

The moral is, let us, then, grow in our greenhouses and gardens all the fragrant herbs we can. Here is a taste—a fashion if you will—that has come down to us from the foundations of human history; not a fashion like that of bicycles or bonnets, but a precious possession for all time. From

the day when the great Creator gave food for the cattle and "herb for the service of man" the perfume-distilling leaves have been with us as they will be with us in joy and in sorrow, in life, in love, and in death, to the end of time.

A B C LIST OF PERFUMES, ESSENTIAL OILS, &c., AND PLANTS WHICH AFFORD THEM.

"The breath of flowers is far sweeter upon the air where it comes and goes like the warbling of music than in the hand; therefore nothing is more fit for that delight than to know something of the flowers that do best perfume the air."—*Lord Bacon*.

ACCORDING to Dr. Piesse, the six plants grown most extensively for perfume are Jasmine, Acacia, Roses, Bergamot, Orange Violet, and the Tuberose.

This list does not profess to be complete, since nearly every plant that grows has odour or fragrance of some sort or other, however slight it may be. Even species and varieties of the same species vary very much in odour, as is abundantly proved by species of, say, *Dendrobium*, *Reseda*, or *Diosma*, and by varieties of H.P. or Tea-scented Roses, Apples, Pears, or Sweet Oranges, no two varieties smelling or tasting precisely alike. This is even true sometimes of individual fruits off the same tree. All that is here attempted is to give a bird's-eye view of the plants most generally grown for fragrance, and especially of those having sweet-scented leaves as well as flowers.

The growth or evolution of the perfumer's art began in Egypt and Greece, having probably come thence from the East. From Greece it naturally came to Rome, and thence to France long before it reached our own shores.

The master perfumers of Paris received a charter from Philip Augustus of France in 1190, but the trade scarcely began in England until the time of Elizabeth; and even so late as 1860 there were only forty manufacturing perfumers in all England, while at the same date there were eighty in Paris alone. There does not appear ever to have been a perfumers' company in London. No such trade as that of a perfumer was known in Scotland until after the year 1768.

Acacia.—Shrubs or small trees mostly from Australia and North Africa. *A. Farnesiana* is largely cultivated at Grasse for its flowers.

Achillea millefolium (Yarrow).—Aromatic herb, both foliage and roots being odorous.

Acorus Calamus.—Sweet flag. Largely grown from time immemorial for its rhizomes in the East. It is cultivated in fen districts in England, on the Continent, and especially on the shores of the Black Sea.

Ajoman (*Ptychotis ajoman*).

Alliaceous odours.—Characteristic of Onions, Chives, Leeks, Garlic, &c. (*Liliacæ*). As showing that taste and smell do not always agree, we may instance that the taste or flavour of Onions, &c., is enjoyed by many who detest the smell of them. (Shakespeare, "Midsummer Night's Dream," iv. 2.)

Allspice (*Pimento officinalis*).

Aloysia citriodora.—Lemon-scented Verbena, a well-known shrub from Chili, deservedly much grown in gardens, and hardy in warm and sheltered corners near walls and plant-houses. Its leaves retain their odour when dried, and are often placed in the teapot in Spain to add their aroma to the tea.

Andropogon citratus.—Lemon-grass. This and several other species are grown or collected in India, Ceylon, &c., and the essential oil they produce is known as "Indian Geranium" oil. It is grown as a stove plant, and its leaves when fresh are used for flavouring confectionery.

Angelica archangelica (*A. officinalis*).—A tall herbaceous plant (*Umbelliferae*) the fleshy stems of which are very aromatic, and are candied or preserved in syrup and used in confections.

Oil of *Angelica* is used in Chartreuse and other liqueurs.

Angostura (*Galipea cusparia*).—Used as a tonic stimulant.

Anise (*Pimpinella anisatum*).

Anthemis nobilis (Chamomile).—A dwarf evergreen composite plant, grown for its single, or double, Daisy-like flowers, which are used medicinally.

Anthoxanthum odoratum (Sweet Vernal Grass).—This grass belongs to the Coumarin series of perfumes, and gives its peculiar fragrance to the hay crop. The essential oil is used in perfuming cheap Tobaccos, &c.

Artabotrys (*Artabotrys odoratissima*).—A flowering shrub having warm aromatic leaves and very sweet Apple-scented flowers, from which a perfume is derived. The leaves have been used in Java as antispasmodic in cholera, as also those of *Melaleuca minor*.

Artemisia Abrotanum (Lad's Love, or Old Man).—A well-known plant in most cottage gardens, having finely cut and agreeably aromatic leaves. *A. Absinthium* is "Wormwood" used in rustic medicine and in the manufacture of absinthe in France and Belgium.

Asperula odorata (Woodruff).—A little rubiaceous woodland plant having whorled leaves and white flowers, deliciously aromatic, somewhat like the "Sweet Vernal Grass," used fresh or dried in posies and bouquets, and sweet bags. The flowers infused in Rhine wine yield the "Maitrank" of Germany.

Azara microphylla.—An evergreen shrub or small tree from Chili bearing a profusion of greenish yellow flowers beneath its branchlets in March and April, and yielding a delicious perfume of vanilla.

Baldo (*Peumos fragrans*).—Somewhat like Sweet Gale (*Myrica Gale*).

Balm (*Melissa officinalis*).

Balsam of Mecca (*Balsamodendron Opobalsamum*).—Aromatic gum resin, highly valued by the Arabs and Indian Mussulmen.

Balsam of Peru (*Pereiræ myrospermum*).—A leguminous tree, native of Central America; but the balsam is now rarely obtained and little used. It was employed for chronic coughs, ulcers, and in the making of pastilles.

Balsam of Tolu (*Myrospermum Toluifera*).—Similar to the last and employed in same way, but now rare.

Balsamita vulgaris (Costmary or Alecost).—A hardy herbaceous plant from Italy having balmy or aromatic foliage.

Barosma crenulata (Buchu Leaves).—Evergreen shrubs from South Africa.

Basil (*Ocimum Basilicum* and other species).—Basil is a delicious pot-herb much used in the south of Europe.

Bdellium (*Boswellia glabra*).—Also a gum resin from *Balsamodendron africanum* (African *Bdellium*). *Amyris Bdellium* or *Balsamodendron Roxburghii* is "Indian *Bdellium*."

Benzoin (*Styrax Benzoin*).—Not to be confounded with *Laurus Benzoin*. It is an aromatic gum resin, not much used except in incense. Native of Borneo and Indian islands. It is sometimes called "Gum Benjamin." False Benzoin is obtained from two or three species of the genus *Terminalia*.

Bergamot (*Monarda didyma*).

Bitter Almond.—Yielded also by Cherry Laurel (*Cerasus Lauro-Cerasus*).

Bluebell (*Scilla nutans*).

Boronia megastigma.—Nearly all the species have aromatic leaves, but in the one named the brown and yellow-lined flowers are deliciously fragrant. It is a well-known Australian plant, largely grown now for its perfume both on the Continent as well as in English gardens.

Boswellia serrata (*Frankincense* or *Gum Olibanum*).—An Indian tree yielding an aromatic gum that is one of the principal ingredients in modern as of ancient incense.

Box Tree (*Buxus sempervirens*).—A well-known native evergreen tree which O. W. Holmes describes as "breathing the fragrance of eternity, for this is one of the odours which carry us out of time into the abysses of the unbeginning past."

Buchu.—The leaves of *Barosma crenulata*.

Buxus sempervirens (see Box Tree).

Cajeput (*Melaleuca Cajeputi* and *M. minor*) yields greenish aromatic essential oil, employed as an antispasmodic and stimulant. The leaves are used in China and Malaysia as a tonic in the form of a decoction.

Californian Bay.

Calycanthus floridus (*Carolinian Allspice*).—Young and fresh flowers, as also the bark, agreeably scented.

Camel Grass (*Andropogon lanigerum*).—Another scented grass allied to "Lemon Grass."

Camphor (*Kopher*, *H.*).—*Dryobalanops Camphora*, *D. aromatica*, and probably other species, forming large forest trees in Borneo and other Eastern islands, where, as in China, Camphor-wood trunks and boxes are valued as resisting the termites, or "white ants."

Camphor is also obtained from *Laurus Camphora*, a tree found wild in Formosa, and it also exists in the Common Rosemary (*Rosmarinus officinalis*). Antispasmodic.

Camphora (*Laurus*) officinarum (Chinese Camphor Tree).

Canella (*Canella alba*) produces an aromatic bark.

Caraway (*Carum Carui*).—Seeds used in confectionery, and yield aromatic essential oil.

Cardamom (*Elettaria Cardamom*).—Seeds used as a stimulant, or to chew after smoking, or they yield an essential oil.

Carnation (*Dianthus caryophyllus*).

Carolinian Allspice (*Calycanthus floridus*).—Both bark and fresh flowers are agreeably fragrant, but the old and decaying flowers smell like sour beer.

Cassia Clove (*Dicypellium aromaticum*).—The sweet bark is used sparingly.

Cedar.—*Juniperus Bermudiana* and various species of the genus *Cedrela*, of which cigar boxes are often made. The timber of *Cedrus Libani* "Cedar of Lebanon" is only of use for building cabinet work or fuel.

Cedrela odorata (Barbadoes Cedar-tree; *C. Sinensis* is Chinese Cedar Tree).

Cereus grandiflora (Night Scented Cactus).—Nearly all night blooming Cacti or Cerei are perfumed.

Chamomile (*Matricaria chamomila*).

Champac (*Mitchelia Champaca*).—One of the sweetest and most highly prized of all the scented flowers of the East; in appearance like a small *Magnolia*.

Cheiranthus Cheiri (Wallflower).—Grown by the acre in Cornwall and near all large towns for its fragrant flowers. Found on old walls, as at Conway, Nottingham, &c. Everywhere in Britain and Normandy it merits its popular name, and with Sweet Violas and Mignonette sweetens many a cottage garden.

Chrysanthemum indicum (Garden Chrysanthemum, Queen of Autumn).—Both flowers and foliage possess an aromatic Pyrethrum-like odour.

Cinnamon (*Cinnamomum zeylanicum*).—This aromatic tree produces bark of a highly aromatic character. This bark in a powdered state is often used as a condiment at meals and in cookery. Oil of Cinnamon is inimical to bacteria. *Cinnamomum Cassia* is most aromatic.

Citrine odours.—Characteristic of aurantiaceous plants (Orange family), leaves, and rind of the fruit; also in *Aloysia citriodora* and in many *Eucalyptus*. Large quantities of Orange leaves

as well as flowers and fruits are grown for the perfume industry in Italy, South France, and Spain.

Citrus aurantium (Orange), *C. Limonum* (Lemon), and *C. Limetta* (Lime Fruit); and many other varieties are largely grown for flavours and perfumes in South Europe and North Africa, and in the East (see Bonavia "Oranges and Lemons of India and Ceylon").

Clethra alnifolia (Mignonette Tree).—A large shrub or small tree from North America bearing very sweet flowers.

Clove (*Caryophyllus aromaticus*).—The young flower buds dried are the cloves of commerce, yielding a powerful and agreeable essential oil fatal to many putrescent bacilli.

Comptonia asplenifolia (Sweet Fern-bush). Leaves smell like "Bog Myrtle."

Coriander (*Coriandrum sativum* and other species).

Cotton Lavender (see *Santolina*).

Coumarin.—Hayfield odour, given off by Sweet Vernal Grass and Woodruff (*Asperula odorata*) when partially dried.

Crataegus oxycantha (Hawthorn or Sweet May).

Crinum asiaticum and many other handsome fragrant species.

Cumin (*Cuminum Cyminum*).

Curcuma Zedoaria, *C. Zerumbet*, and other species have very aromatic rhizomes, leaves and flowers, or seeds.

Cyclamen persicum.

Cyperus rotundus (Sweet Sedge) and other kinds have aromatic rhizomes or stems, tubers, &c.

Cytissus fragrans.

Datura (*Brugmansia*) *suaveolens*.—A well-known greenhouse shrub bearing large, pendent, bell-shaped flowers; very sweet at night.

Dianthus Caryophyllus (Carnation, July or Gillieflower).—All the family of Pinks, Cloves, Carnations, &c., are most deliciously fragrant. "Sops in Wine" were Clove or Carnation blooms thrown into wine flagons for the sake of their rich aroma.

Dill (*Anethum graveolens*).

Diosma ericoides and many other species have very aromatic foliage, and are well-known greenhouse plants.

Dracaena (*Cordyline*) *fragrans* and other species.

Elemi (*Canarium commune*).

Elettaria Cardamomum (Cardamoms).—A warm greenhouse plant resembling Ginger in habit, but hardier, and having richly aromatic foliage. It is a good room plant during the summer months, and is easily grown.

Escallonia macrantha (Shelter Bush).—With sticky, aromatic foliage. One of the best of all evergreen plants for shelter hedges in wind-swept localities.

Eucalyptus.—*Eucalyptus globulus*, *E. citriodora*, and many other (seventy to eighty) species. All the species are aromatic, and yield essential oils; but *E. citriodora* is one of the sweetest. *E. globulus* and others yield "Eucalyptol."

Euryangium Sumbul.—A strong-growing umbelliferous plant of Turkestan and North India used medicinally. The rhizome smells of angelica and musk.

Fennell.—*Fœniculum dulce*, *F. officinale*, &c.

Fragaria elatior (Strawberry).—The scent of dying Strawberry leaves in the early sunshine of a frosty morning is one of the rarest and most delicious of all the scents or perfumes of the garden.

Frangipani (*Plumiera rubra*, *P. allia*, *P. fragrantissima*, &c.).—Commonly planted on graves in Borneo and Malayan islands. The Italian scent named "Frangipani" is a powder, or sachet, made of equal proportions of all known spices mixed with Orris-root and 1 per cent. of Musk and Civet. An alcoholic extract of this "pot-pourri" is the most enduring scent known.

Frankincense (*Olibanum*).—*Boswellia serrata*.

French Honeysuckle (*Hedysarum coronarium*).

Freesia refracta (*Freesias*).—All the *Freesias* emit a subtle and delicious perfume, although by some who are partially anosmic their odour cannot be detected.

Galangal (*Alpinia officinarum*).—A Ginger-like plant having aromatic rhizomes and seeds.

Galbanum (*Ferula galbaniflua*).—A gum resin resembling that of *F. narthex*, the source of *Asafœtida*.

Galipea odoratissima.—A Brazilian tree that yields the Angostura bark of commerce, sometimes used as a tonic bitter, especially in the colonies and abroad.

Gardenia (Cape Jasmines) (*Gardenia florida* and *G. radicans*).—Known as the "Cape Jasmine." These shrubs have highly

perfumed flowers, and yield by effleurage a delicious perfume.

Geranium (see *Pelargonium*).—Many species of *Geranium* and *Erodium* have scented foliage when touched or bruised.

Ginger (*Zingiber officinale*).—Much grown and largely used as a sweetmeat in China and the West Indian islands; also used in cordials and in cookery. For preserving in China species of *Alpinia* and *Hedychium* are often used.

Glechoma hederacea (Ground Ivy).—An aromatic creeping labiate with balmy odour, formerly infused in ale for its flavour.

Grains of Paradise (*Amomum Melegueta*, *A. grana Paradisi*, &c.) produce hot aromatic seeds in globose or triquetrous capsules. They are closely related to Ginger and Cardamoms. The seeds have a camphorated flavour, and have been illegally used in doctoring beer at the risk of a heavy penalty.

Ground Ivy (see *Glechoma*).

Guava (*Psidium guava*, *P. pomiferum*, *P. Cattleianum*) is the Chinese purple Guava, generally compounded into a delicious flavoured jelly or pomade.

Gum Cistus, or Ladanum (*Cistus creticus*), and many other kinds, such as *C. Ladaniferus*, of Spain and Portugal, yield an aromatic gum resin used in perfumery and fumigations by Oriental people.

Gymnema sylvestre.—This is an asclepiadaceous plant, leaves of which were sent to Kew, from Madras. After chewing the leaves, neither sweet nor bitter substances can be distinguished in the mouth. Salts, acids, astringents, and aromatics are unaffected (see *Gard. Chron.*, April 23, 1897, p. 550).

Hawthorn (*Cratægus Oxycantha*).—A well-known native tree with fragrant, white clustered flowers. There are double, and rose, pink, and crimson forms.

Heart's Ease (see *Viola*).

Hedychium spicatum.—The dried roots or rhizomes are pounded and used in the form of incense, and also as a medicine in India.

Hedysarum Coronarium (French Honeysuckle).—A crimson-flowered biennial plant well worth culture.

Heliotrope (*Heliotropium peruvianum*).—Well-known sweet-scented flowering shrubs from Peru. Their flowers are

redolent of "cherry pie," and are used in Spanish confectionery, &c.

Henna (*Lawsonia inermis*).—Much used from Egypt eastward, and mentioned in Song of Solomon, say 1000 B.C. It is a dye tinting the nails red.

Hesperis matronalis (Sweet Rocket).

Honeysuckle (*Lonicera Periclymenum*).—Native Woodbine.

Horehound (*Marrubium vulgare*).

Humea elegans.—A composite greenhouse plant, with leaves scented like Russian leather.

Hyacinth (*Hyacinthus orientalis*).—Well-known odorous flowers.

Iberis odorata (Sweet Candytuft).

Ilang-Ilang (see Ylang-Ylang) (Flower of Flowers).

Iris florentina (Orris-root).—The dried rhizomes of this and other species of German or Flag Iris are agreeably scented like violets, and form the basis of violet powders and other dry perfumes for pomanders, bags, or sachets, &c. Orris-root is largely cultivated, dried in the sun, and prepared in S. France and Italy.

Jasmine.—This is one of the most distinct of all natural odours, and the only one that cannot so far be made artificially, afforded by *Jasminum officinale* and other species grown all over tropical and temperate regions. In the East, Jasmine flowers are rolled up in the well-oiled hair of the women at night, so as to scent the hair and skin next day.

Jonesia (see *Saraca*).

Jonquil (*Narcissus Jonquilla*) and various forms of *N. Tazetta*.—Much grown for perfume at Grasse, Cannes, and elsewhere along the Riviera.

Juglans regia (Walnut).—The agreeable fragrance of crushed walnut leaves is much enjoyed by most people, but so far as I am aware it has not gained the attention from perfumers that its distinctness would seem to deserve.

Juniper (*Juniperus*).

Lastrea montana, *L. æmula*, and other species are scented.

Lathyrus odoratus (Sweet Peas).—Well-known and exquisite annuals.

Laurelia aromatica (Sweet Laurelia).—A rare evergreen with fleshy and deliciously fragrant foliage, hardy only in very warm and sheltered localities. It grows 20 feet high in Co. Wicklow.

Laurus nobilis (Sweet Bay).—Foliage aromatic and much used for flavouring confectionery, figs, sardines, &c. *Laurus Sassafras* is N. American "Spice Bush," having perfumed leaves and aromatic bark. The "Cherry Laurel" is *Cerasus Lauro-Cerasus*, and its prussic acid-like odorous leaves are now and then used in flavouring, also as insecticides.

Lavender (*Lavandula vera*, *L. spika*, *L. stachys*).—Very abundant as a wild plant in Spain, where it is called "Romero Santo." Largely grown at Mitcham, Surrey, and elsewhere in England, the oil being exported and made into Lavender water, Eau de Cologne, &c. M'Donald says that the Queen is very fond of Lavender water, and has it specially distilled for her, the essential oil of Lavender being infused in pure spirits of wine. Lavender is now largely cultivated in Australia and New Zealand.

Lawsonia inermis (see Henna).

Lign Aloes (*Aquilaria Agallocha*).—Also known as "Wood Aloes."

Lilac (*Syringa persica*).

Lilium candidum (White Lily).—This and many other species bear perfumed flowers, some, as *L. auratum*, being too strongly scented for indoor uses.

Lily of the Valley (*Convallaria majalis*).—One of the sweetest and most exquisite of all our native flowers.

Lindera sericea (see Benzoin).

Mace (see *Myristica*).

Magnolia (*Magnolia foetida* and other species).—The Yulan or Water Lily Tree of China and Japan, *M. Fuscata*, and others have highly perfumed flowers.

Malva Moschata (Musk Mallow).

Marrubium vulgare (Horehound).—Aromatic herb used in cough lozenges and other confections.

Matricaria Chamomila (Chamomile).—The flower-heads are used in medicinal stupes and infusions with advantage.

Matthiola bicornis (Night Scented Stock).

Meadow Sweet (*Spiræa Ulmaria*).

Mentha, various species (see Mint).—"Menthol" is a product of this genus.

Mignonette (*Reseda odorata*).—A sweet-scented annual from N. Africa, highly esteemed for its odour. There are many other species, but none so sweet as this.

Mimulus moschatus (Musk).—Well-known cottage garden and window herb.

Mint (*Mentha Piperita*, &c.).—Much grown at Mitcham and elsewhere in S. England for distilling. (Black Mint is said to yield 30 lb., and white 20 lb. per acre.) “Pennyroyal” is *Mentha Pulegium*, var. *Gibraltarica*, a well-known diuretic; *Mentha odorata* is Bergamot Mint; *Monarda didyma* is Oswego Tea; Balm is *Melissa officinalis*; *Cedronella calamint* is Mountain Balm; Basil Balm or Basil Mint is *Melissa acinos*.

Monarda didyma (Bergamot, Oswego Tea).—N. America swamp plant, with an agreeable fragrance either fresh or dried.

Myrica Gale (Sweet Gale or Bog Myrtle).

Myristica officinalis (*M. moschata*).—A tropical tree yielding nutmegs and mace, well-known spices.

Myrrh (*Balsamodendron Myrra*).—Gold, Frankincense, and Myrrh in silk bags are still presented at the offertory in the Chapel Royal, St. James’s Palace, on Twelfth Day by two gentlemen of the Lord Chamberlain’s Office, but formerly by the Sovereign in person.

Myrris odorata is a fragrant umbelliferous plant worthy of culture for its aromatic perfume when touched or bruised.

Myrtle (*Myrtus communis* and many other species).—Well-known aromatic shrubs, easily grown in greenhouses or in sheltered warm localities out of doors.

Myrtus communis (Myrtle).—All the Myrtles and *Eugenias* are aromatic shrubs.

Musk (*Mimulus moschatus* and *Delphinium Brunonianum*).—Animal musk is from the musk deer, &c., and ambergris from a kind of whale.

Musk Mallow (*Malva moschata*).

Narcissus Tazetta (Poet’s *Narcissus*).—All very fragrant and long valued for their perfume (see *Jonquil*).

Night Scented Stock (*Matthiola bicornis*, &c.).—Several kinds very sweet scented, mostly annual.

Nutmegs and Mace (*Myristica moschata*).—Nutmegs are well-known aromatic fruits grated as a spice. The mace, or arillus, is the inner coat of the nut beneath the orange outer husk, and is also very sweet and grateful as a spice.

Olea fragrans.—Sweet white flowers, used in China for scenting tea, &c. (see *Osmanthus*).

Olibanum (*Boswellia serrata*).—Supposed to be the frankincense of the ancients.

Opoponax (*Opoponax Chironium*).—From the south of Europe, in habit like a parsnip; 6 feet high; yields a fragrant gum resin, very aromatic, but now not much used.

Orchids.—A large number of tropical species, are very fragrant, the white and green flowered kinds especially at night, others at different periods of the day. A good list is given in Donald M'Donald's "Sweet-scented Flowers and Fragrant Leaves," pp. 85-90. Vanilla is the fruit pods of *Vanilla planifolia*, &c., used in flavouring chocolate and confectionery. Orchids rarely possess a perfume that is not also yielded by other flowers. *Anguloa Clowesii* smells of Fenugreek; *Dendrobium macrophyllum* like Turkey Rhubarb; *Lycaste Harrisoni* smells like 'roasted Apples'; *Odontoglossum Roezlii* like Wild Field Rose (*R. arvensis*).

Osmanthus (*Osmanthus fragrans*) and other species (see *Olea*).

Oswego Tea (*Monarda didyma*).

Pancratium (*Hymenocallis*) *fragrans* (Wedding Lilies) and other species.—Deliciously fragrant.

Patchouli (*Pogostemon Patchouli*).—A low soft-leaved labiate shrub with scented leaves that were formerly used to scent the Indian shawls.

Pelargonium (*Geranium*).—Many species and varieties of the Cape Pelargonia have sweet-scented foliage, and are much grown for the decoration of rooms and conservatories on that account. Their dried leaves are useful for pot-pourri, &c. A good list of the scented kinds may be found at p. 92 of M'Donald's book already cited (see Books).

Pergularia (*P. odoratissima*).—The flowers are deliciously fragrant and yield a choice perfume.

Philadelphus (Mock Orange, *Syringa*).—All the species and varieties bear sweet-scented flowers, similar to Orange blossoms in the bud state. The green leaves possess a flavour similar to that of Cucumber, and may be used sparingly in claret-cup as a substitute if Cucumbers are not available.

Pimento, or All Spice Tree (*Pimento officinalis* and *P. acris*).—The last named being largely used in making West Indian bay rum. In 1886 the exports of Pimento from Trinidad = £46,704, and in 1896 they had increased to £90,046.

Little Dominica exports £4,000 worth of bay leaves and oil ; Trinidad grows ten times the quantity, none being utilised for export.

Pogostemon (see *Patchouli*).

Polianthes tuberosa (Tuberose).—Largely grown in South France for perfume, native of India. The fading flowers, like those of *Tropæolum*, have been seen to emit flashes of light at night.

Primrose (*Primula acaulis*).—This genus of many species found nearly all over the world contains many with delicate odours, but none more delicious than our Wild Primrose, Oxlip, and Cowslips of the meadows.

Rockets (*Hesperis matronalis*).—Well-known fragrant garden plants.

Rondoletia (*Rondoletia odorata*).

Rosaceous odours.—The Eastern Attar or Otto of Roses is one of the most delicious and valuable of perfumes in its pure state, but it is often largely adulterated by the addition of Indian "Geranium" oil (*Andropogon*).

Rosemary (*Rosmarinus officinalis*).—A very similar oil is afforded by *Cedrela Rosmarinus* of North China.

Roses.—An enormous genus, most of which produce deliciously perfumed flowers. Attar de Rose from Persia, Cashmir, Turkestan, &c., when pure is one of the choicest and rarest of perfumes. It is usually, however, adulterated with Lemon Grass oil (see M'Donald's book, pp. 104–122, for a full list of sweetest Roses, &c.).

Salvia rutilans (Pineapple Sage).—This is a fragrant greenhouse plant. *Salvia officinalis* is common "Garden Sage" used for flavouring.

Sambucus nigra (Common Elder).—The leaves have an odour that helps to keep away flies, especially if mixed with those of Tansy. Flowers sweet, used for Elder-flower water.

Sanitas.—In 1875 Mr. C. T. Kingzett, after observing the excess of ozone and salubrity of the air near to Pine and Fir tree plantations, and conceiving that this was in part due to their volatile oils producing peroxide of hydrogen and camphoric acid, formed these reagents by a process involving the decomposition of turpentine, and it was made and sold in 1877 under the above name.

Santal (*Santalum album*).—Indian sandal-wood, much used for cabinet work and for burning in place of pastilles in India and the East. Said to be one of the ingredients used in making the “joss-sticks” of the Chinese.

Santolina Chamæcyparissus (Lavender Cotton).—A woolly-leaved little shrub with aromatic leaves, useful for edgings or low fences. Grows well in hot and barren places. Sprigs of it are useful for mixing with dried Lavender to keep away moths.

Saraca indica (= *Jonesia asoca*).

Sassafras (*Sassafras officinale*).—This and one or two other species have aromatic bark and nuts or seeds which yield a scented oil.

Satureia officinalis (Savory).—Pot-herb.

Scilla nutans (Bluebell).

Souchet (*Cyperus* species).—The dried tubers are used. *C. longus* is “English Galangale” (Gerard).

Spikenard (*Nardostachys Jatamansi*).—A dwarf Valerian having an aromatic root, found in North India, and long ago very highly prized. It is now supposed to be the “nard” or “nerd” of the Scriptures, and one of the ingredients in the alabaster box of ointment used by Mary in anointing the feet of our Lord. “Ploughman’s Spikenard” is the root of *Inula Conyza*, of which Ben Jonson asks: “Have you smelt the bud of the briar or the nard in the fire?”

Spiræa Ulmaria (Meadow Sweet).—Leaves odorous and quite different from scent of the flowers.

Star Anise (*Illicium verum*).

Stephanotis (*Stephanotis floribunda*) Climbing Tuberose).—A well-known stove-climbing shrub having clusters of tubular and highly perfumed flowers.

Stocks (*Matthioli incana*, *M. triste*, &c.).—Several kinds, both diurnal and nocturnal bloomers and highly perfumed.

Storax (*Styrax officinalis*).—This shrub is found in the Levant, but its balsamic resin is not now easily obtained. The storax now used is from *Liquidambar orientale*, found in Asia Minor. Used in perfumery and as an expectorant.

Sweet Bay (*Laurus nobilis*).—A well-known aromatic evergreen bark, leaves, and fruits being very fragrant. Long grown in European gardens and often used for funeral wreaths.

Sweet Flag (*Acorus Calamus*).—Long used as a perfume plant.

It was the common perfume of the Romans, but they prized more highly the Roses of Pæstum, Spikenard, Telinium, Medebathrum, Onegalum, Balm of Gilead, and Cinnamon.

Sweet-scented Golden Rod (*Solidago odora*).

Syringa persica, &c. (Lilac).—One of the sweetest of hardy garden shrubs. Forced Lilac is deliciously sweet.

Tansy (*Tanacetum vulgare*).—Fern-like foliage aromatically scented, and it is now and then used in order to try and keep flies out of rooms. Used also in cookery, Tansy puddings, &c.

Thyme (*Thymus vulgaris*).—A well-known garden herb and the source of "Thymol," &c. *T. citriodorus* is "Lemon Thyme."

There are many species grown as rock plants, all more or less scented.

Toddalia (*Toddalia aculeata*).

Tonquin Bean=Seeds of *Dipteryx odorata*, Willd., from Guiana.

Tuberose (*Polianthes tuberosa*).

Tussilago fragrans (Sweet Tussilage; Winter Heliotrope).—An Italian plant naturalised abundantly near Dublin and elsewhere, and flowering freely in January and February, when roads and lanes are redolent with its Heliotrope-like perfume. It is a dreadful weed in many Irish gardens.

Valerian (*Valeriana Wallichii*).—Now and then used as an aromatic, and in medicine more rarely as a stimulant and antispasmodic. The dried root of *Valeriana officinalis* is very attractive to cats, and is said to be employed by rat-catchers to decoy their victims to their traps. *V. celtica* has fragrant rhizomes used in toilet mysteries like Sambul.

Vanilla (*Vanilla planifolia*, *V. aromatica*, and other species).—The fruits or beans are long and dark brown, or chocolate-coloured, and possess a very strong aroma, flavour, and perfume. The essential flavouring principle of Vanilla can now be made artificially from Pine-tree sawdust. Both the natural and the chemical products are used for flavouring chocolate and other sweetmeats. Vanilla is sometimes adulterated with Tonquin Bean extract.

Vegetable Wax or Candleberry (*Myrica cerifera*).—The fruits are coated with a waxy resin from which aromatic candles are, or were, formerly made in America.

Verbena officinalis (Vervain, Herb of Grace).

Vetiver (*Andropogon Schænanthus*).—The oil of *Andropogon* is sometimes called “Indian Geranium” oil, having a citrine odour. Used to adulterate Attar de Rose and in the manufacture of cheap perfumes. Used in India for screens or “Cuscus tatties.”

Violet odours.—The well-known Sweet Violet (*Viola odorata*) in all its forms, also present in some Orchids and in “Orris” root (*Iris florentina* and other species). Violets and Iris are largely grown in Italy, Sicily, Sardinia, and South France for the perfume trade. All the race of Garden Violas or “Tufted Pansies” are sweet and exquisite garden flowers. “Violetta” and other of Dr. Stuart’s race of rayless Violas are charmingly dwarf, dainty, and sweet-scented.

Vitis riparia and other Wild Grape vines of North America have sweet-scented flowers.

Wallflower (*Cheiranthus Cheiri*).—One of the hardiest and sweetest of all our native flowers.

Winter Green (*Gaultheria procumbens*); also from *Betula Ceuta*.

Winter Sweet (*Chimonanthus fragrans*).—Waxy yellow flowers produced in winter with a spicy perfume.

Wistaria Sinensis (Chinese *Wistaria*, or Pergola Flower).—Drooping racemes of deliciously sweet purple or white Pea-like blossoms.

Woodruff (*Asperula odorata*).

Yarrow (*Achillea millefolium*).

Ylang-Ylang, Ilang-Ilang (*Cananga odorata*).—A tree growing in Java, Burma, &c., with very fragrant yellowish green flowers. The name literally means “flower of flowers,” and the extracted perfume is more valuable than Attar de Rose.

Zedoaria (*Curcuma*).—C. Zerumbet and many other kinds.

A FEW BOOKS AND NOTES ON THE SUBJECT OF PERFUMES, &c.

? 1491 B.C. Exodus xxx. Also later, Song of Solomon v. 13. vi. 2. St. Mark xiv. 3. St. John xii. 3-5. Myrrh, Spices, Cinnamon, Cassia, Frankincense, Stacte, Onycha, and Galbanum came from India, Persia, and East Coast of Africa.

There is no mention of Camphor, Cloves, Nutmegs, Betel Leaf, Cubebs, or Gamboge, which may show the trend of commerce in Bible times. The "precious ointment" of the Scriptures was a compound of Olive oil, Myrrh, Cassia, Cinnamon, and Sweet Calamus, &c. It was a sacred production, and could not be used for secular purposes. A precious ointment is still used for the Pope's Golden Rose. In the early Christian Church not only incense but the oil of the lamps, and even the wax of tapers, &c., were perfumed.

374-286 B.C. Theophrastus wrote a work on fragrant plants in which he says: "Perfumes are made from Roses, White Lilies, and Violets, some from stalks and some from roots."

? 200 B.C. Apollonius of Herophila, who wrote a treatise on perfumes alluded to by Pliny. "The Iris," says Apollonius, "is best at Elis and at Cyzicus; perfume from Roses is most excellent at Phasalis, Naples, and at Capua; that made from Crocus is in highest perfection at Soli in Cilicia and at Rhodes; the essence of Spikenard is best at Tanius; the extract of Vine leaves at Cyprus and at Adramythum; the best perfume from Marjoram and Apples comes from Cos; Egypt bears the palm for essence of Cyprinus, and the next best is the Cyprian and the Phœnician, and after them comes the Sidonian. The perfume called Panatheniaceum is made at Athens, and those called Metopian and Mendesian are prepared with the greatest skill in Egypt."

65 B.C. Horace was very fond of flowers and perfumes. In his ode celebrating the return of Augustus from Spain he bids the slaves set rarest perfumes, and especially desires the tuneful Nææra to make haste and knot up her scented hair.

1250. The Doge of Venice even so far back as the thirteenth century "might receive no presents or gifts from anyone, except offerings of rosewater, leaves, flowers, and sweet herbs. In the event of a marriage he might receive gifts of food only, and he had to exact an oath from the Dogressa and all his children to observe this rule strictly."—*Venice*: "Story of the Nations" Series, p. 156. (1894.)

1527. Master Jerome Brunswick, "The Vertuose booke of Distillacyon of the waters of all manner of Herbes," folio, newly translated out of Duyche into Englysshe, by the printer Lawrence Andrew, London. This is a rare and

- curious book, and may be taken as one of the earliest of "still room" guides.
1568. Dodoens, R., "Florum et Coronarium odoratarumque nonnullarum herbarum historia." Remberto Dodonæo Mechliniensis Medico auctore. Antwerpiae. Ex officina Christophori Plantini. 8vo. 1568.
1574. (Cortese Isabella) Secreti di la Signora Isabella Cortese ne quali si contengono cose minerali medicinali artificiose e d'alchemiche e molte del arte Profumatoria appartenenti a ogni gran Signoria Venetia. 1574. 12mo.
1647. Markham Gervase, "The English Housewife," containing the inward and outward vertues which ought to be in a compleat woman, and it treats specially of "Conceited Secrets, distillations, and perfumes." Herein will be found good old recipes for "perfuming gloves and jerkins and for the making of perfumes to burn, for pomanders, and for sweet bagges, Damask water," etc.
1648. "The Country Housewife's Garden" on the division and husbandry of Herbs, etc.
- 1680-90. Temple, Sir William, "Essay on Health and Long Life," says: "Fumigation or the use of scents is not practised in modern physick, but might be carried out with advantage, seeing that some smells are so depressing, or poisonous, and others so inspiriting and reviving." Walking in the India House at Amsterdam, where Cloves, Nutmegs, Mace, &c., were kept in great quantities, he was so revived by their aromatic fragrance that both he, and those with him were much exalted in health and in humour.
1740. Albrecht, B. G. "De aromatum exoticorum noxa et nostratum prestantia." 4to. Erfordiae.
1800. Buc'hoz, J. P., "Manuel cosmétique et odoriférant des plantes." 4to. Paris.
1801. "La Toilette de Flore." Buc'hoz' Manuel with different title.
1822. An old English work on perfumes by the once noted Charles Lilly was edited by Colvin Mackenzie. Lilly, or Lillie, was a practical perfumer, and had a shop at the corner of Beaufort Buildings, Strand, where Rimmel's now stands, and he is constantly alluded to in the *Spectator*, *Tatler*, *Guardian*, &c., of his day.

1838. Lindley, John, Ph.D., "Flora Medica," a botanical account of all the more important plants used in medicine in different parts of the world. London: Longmans & Co.
1842. Calcott, Marie, "The Flowers and Plants of Scripture" (London: Longmans & Co.), with woodcut illustrations drawn by the authoress. A very interesting book, in which all her authorities are scrupulously given.
1843. Mott, F. T., "Flora Odorata," a characteristic arrangement of the sweet-scented flowers and shrubs cultivated. London, 8vo. This is one of the early modern works on scented flowers, and none of the later authors have a good word for it; but its insufficiency led M'Donald on to better things.
1853. Lindley, John, Ph.D., "The Vegetable Kingdom; or, the Structure, Classification, and Uses of Plants." 3rd edition, 8vo. London: Bradbury & Evans.
1854. Celnart, "Nouveau Manuel Complet de Parfumeur." 18mo. Paris.
- 1854-57. Pereira, "Elements of Materia Medica." 8vo., 2 vols. London.
1855. Bain, Dr. Alexander. Treatises on "The Senses and the Intellect," &c.
1865. Rimmel, E., "The Commercial Use of Flowers and Plants." 8vo. London.
1868. Silva Contino, "Gommes, Résines, et Gommes-résines." 8vo. Paris.
1874. Hanbury & Fluckijer's "Pharmacographia," a well-known standard work on plants yielding perfumes, spices, gums, resins, and essential oils generally.
- 1875-80. Trimen & Bentley, "Medicinal Plants," good figures by D. Blair. A standard book.
1877. Barton & Castle, "The British Flora Medica," a new edition by John R. Jackson, A.L.S. London: Chatto & Windus.
1879. Piesse, G. W. Septimus, Ph.D., F.C.S. 4th edition. London: Longmans, Green & Co. "The Art of Perfumery," and the methods of obtaining the odours of plants, the growth and general flower-farm system of raising fragrant herbs, with instructions for the manufacture of perfumes for the handkerchief, scented powders, odorous vinegars and

salts, snuff, dentifrices, cosmetics, perfumed soap, &c., to which is added an appendix on preparing artificial fruit essences, &c.

1881. Hope, Francis J., "Notes and Thoughts on Gardens and Woodlands," written chiefly for amateurs. 8vo. London: Macmillan. A charmingly fresh and practical book, containing articles on "Sweet-scented Greenhouse Plants," "Flowers for the Poor and the Sick," and a remarkable one on "Flowers for the Blind." It is a work not sufficiently known.

1881. Books on Medicinal Plants. See Daydon Jackson's "Guide to the Literature of Botany," p. 199 *et seq.*

1883. Grindon, Leo H., "The Shakespere Flora." Manchester: Palmer & Howe. London: Simpkin & Marshall. 8vo. A very interesting book. See page 201 for chapter on "Odoriferous and Medicinal Herbs," &c.

1885. "Bible Flowers and Folklore." London: Hodder & Stoughton, 8vo., is another very interesting little work on the fragrant vegetation of the Scriptures.

1885. Gilman, Arthur, M.A., "Rome: Story of the Nation" Series, p. 18. London: T. Fisher Unwin. "On April 21, 753 B.C., we are told the shepherds began to build the city of Rome, and a feast of purification was begun. Towards evening the flocks and herds were fed and the stables sprinkled with water from laurel brooms, sulphur incense, rosemary, and fir-wood were burned, and the smoke was made to pass through the stalls to purify them, and even the flocks themselves were made to pass through the same cleansing fumes."

1889. Boulger, G.S., F.L.S., "The Uses of Plants: a Manual of Economic Botany." London: Roper & Drowley.

1889. Lindley & Moore, "The Treasury of Botany: a Popular Dictionary of the Vegetable Kingdom." This cheap and handy work is almost indispensable to gardeners, and ought to be better known. 2 vols. London: Longmans, Green & Co.

1890. Jackson, John R., A.L.S., "Commercial Botany of the Nineteenth Century." London: Cassell & Co.

1892. Leonard & Christy, "Dictionary of Materia Medica and Therapeutics." London: Ballière, Tindall & Cox, King William Street, Strand, W.C.

1892. Sawyer, J. Ch., "Odorographia." 2 vols. London: Gurney & Jackson, 1 Paternoster Row. The author is still engaged on the subject, and hopes to publish a third volume. This work may be considered the most modern and reliable work on perfumes, and one to which I am largely indebted in the preparation of this paper.
1893. Schimmel & Co., Leipzig, "List of Essential Oils, Organic and Synthetic Products." A very handy pamphlet enumerating about 150 essential oils and about fifty organic and synthetic products, showing what parts of the plant yield the oils, and the main constituents of the products derived from the oils and their chemical composition. 8vo. Leipzig: Frederick Groher.
1895. McDonald, Donald, "Sweet-scented Flowers and Fragrant Leaves." Being interesting associations gathered from many sources, with notes on their history and utility. With an introduction by W. Robinson, and 16 coloured plates. This is a charming little book on the subject, and contains a very full list of perfumed or scented plants for the garden. There are good lists of Scented-leaved Geraniums (*Pelargonias*), Roses, and Orchids. The introduction alone is well worth the price of the book, being a nervous and well-studied bit of prose by a past master in fragrant plants and gardens beautiful.
1896. Ellacombe, Henry N. Canon, &c., "The Plant Lore and Garden Craft of Shakespeare." New edition, illustrated. London and New York: Edwin Arnold. One of the very best of the many works dealing with the plants of Shakespeare's time, and full of interest to all garden lovers.
1897. Earle, Mrs. C. W., "Pot-pourri from a Surrey Garden." London: Smith, Elder & Co. This is a charming book, with original notes on gardening, &c. On p. 8 the authoress says: "On the backs of my armchairs are thin Liberty silk oblong bags, like miniature saddle-bags, filled with dried lavender, sweet verbenas, and sweet geranium leaves. This mixture is much more fragrant than the lavender alone. The visitor who leans back in his chair wonders from where the sweet scent comes."
1897. Sternberg, "Text-book of Bacteriology." See p. 199, &c., for records of experiments with essential oils, &c., and bacilli.
- Grant Allan, "Physiological Æsthetics," p. 77.

CHEMISTRY OF ODOURS.

Those interested in the chemistry of perfumes should consult the journals published by the pharmaceutical and chemical societies of England, France, Italy, Spain, and Germany, especially the last named, as a considerable part of the trade in essential oils and perfumes is now in the hands of German specialists. For statistics, imports, exports, &c., see the "Board of Trade Returns."

Dugald Stewart, see "Works," vol. iv. p. 300, for remarkable case of James Mitchell.

"Encyclopædia Britannica," 9th or last edition, see articles on Perfumes, Scent, Spices, Incense, Condiments, Smell, &c. "Chambers's Encyclopædia" also contains much interesting information under above heads.

Franck, François, "Olfaction," Dict. Ency. des Sciences médicales, 2nd series, contains a full history of the sense of smell. 1804-54. Kitto, Dr. John, "Cyclopædia of Biblical Literature," see Perfume, Ointment, Balm, Balsam, Spice, &c.

Owen's "Comparative Anatomy and Physiology of Vertebrates." Ramsay, Dr. William, "Essay on Smell and Chemical Constituents affecting Nerve Centres of the Nose," &c. (*vide* "Nature," vol. xxvi. p. 187).

Vintschgau, Prof. V., "Hermann's Handbuch der Physiologie d. Sinnesorgane," zweiter Theil, "Geruchsinne," p. 226, &c.

* * Since the above paper was written Professor Ayrton, President of the Physical Science Section, read a most interesting paper on the sense of smell at the British Association meeting at Bristol, September, 1898.

LIST OF PLANTS REPRESENTED AT THE SOCIETY'S
MEETING, APRIL 26, 1898.

To illustrate Mr. Burbidge's lecture the undermentioned specimens were kindly sent by—(1) Leopold de Rothschild, Esq., Gunnersbury House, Acton (gardener, Mr. Hudson); (2)

Earl of Annesley, Castlewellan, Co. Down, Ireland (gardener, Mr. T. Ryan); (3) The Director, Royal Gardens, Kew; (4) Messrs. Jas. Veitch, Chelsea; (5) R. J. Lynch, Esq., Botanic Garden, Cambridge; (6) Trinity College Botanic Gardens, Dublin :—

<i>Adenandra fragrans.</i>	<i>Habrothamnus Neweli.</i>
<i>Agathosma rugosa.</i>	<i>Humea elegans.</i>
<i>Aloysia citriodora.</i>	<i>Hypericum prolificum.</i>
<i>Amomum cardamomum.</i>	<i>Illicium verum.</i>
<i>Artemisia abrotanum.</i>	<i>Isatis tinctorium.</i>
<i>A. absinthium.</i>	<i>Juniperus sabina.</i>
<i>Azolla filiculoides.</i>	<i>Laurelia aromatica.</i>
<i>Barosma foetidissima.</i>	<i>Laurus nobilis.</i>
<i>Boronia tetrandra.</i>	<i>Lantana, seedling.</i>
<i>Bupleurum fruticosum.</i>	<i>Lastrea fragrans.</i>
<i>Buxus arborescens.</i>	<i>Lavendula spica.</i>
<i>Calycanthus floridus.</i>	<i>L. vera.</i>
<i>Camphorum officinarum.</i>	<i>Ledum palustre.</i>
<i>Chenopodium anthelminticum.</i>	<i>Mentha Gibraltarica.</i>
<i>Choisya ternata.</i>	<i>M. viridis.</i>
<i>Chrysanthemum maximum.</i>	<i>Myrica cerifera.</i>
<i>Cinnamomum sericeum.</i>	<i>M. Gale.</i>
<i>C. zeylanicum.</i>	<i>Myrtus communis.</i>
<i>Citrus aurantium.</i>	<i>Nuttallia cerasiformis.</i>
<i>Citrus trifoliata.</i>	<i>Olearia argyrophylla.</i>
<i>Cupressus macrocarpa.</i>	<i>Ozothamnus rosmarinifolius.</i>
<i>Diosma capitata.</i>	<i>Pelargonium, Apple-scented.</i>
<i>D. ericoides.</i>	<i>P. capitatum.</i>
<i>D. gracilis.</i>	<i>P. crispum.</i>
<i>D. var.</i>	<i>P. Fair Helen.</i>
<i>Drimys aromatica.</i>	<i>P. fragrans.</i>
<i>D. Winteri.</i>	<i>P. Lady Mary.</i>
<i>Eucalyptus coccifera.</i>	<i>P. Lady Plymouth.</i>
<i>E. citriodorus.</i>	<i>P. Lady Scarborough.</i>
<i>E. Gunni.</i>	<i>P. Little Gem.</i>
<i>E. globulus.</i>	<i>P. odoratissimum lobatum.</i>
<i>E. Hæmastoma.</i>	<i>P. Pheasant's Foot.</i>
<i>E. rostrata.</i>	<i>P. Prince of Orange.</i>
<i>E. viminalis.</i>	<i>P. quercifolium.</i>
<i>Ferula communis.</i>	<i>P. Radula major.</i>

Pelargonium tomentosum.	Salvia rutilans.
Phlomis fruticosa.	Santolina incana.
Phygellus capensis.	Skimmia laureola.
Pimenta officinalis.	Solanum crispum.
P. acris.	Tanacetum vulgare.
Piptanthus nepalensis.	Thuja Lobbi.
Pogostemon Patchouly.	T. L. atrovirens.
Prostranthera lasianthos.	T. vervæneana.
Psorala glandulosa.	Thymus citriodora aurea.
Rhopala corcavadenis.	T. c. argentea elegantissima.
Rosa rubiginosa.	T. vulgaris.
Rosmarinus officinalis.	Umbellularia californica.
Ruta graveolens.	Valeriana officinalis.
Salvia officinalis.	

OBSERVATIONS ON SOME PLANTS EXHIBITED.

By the Rev. Prof. G. HENSLOW, M.A., V.M.H., &c.

[May 10, 1898.]

ALPINE PLANTS.—Mr. Henslow took as his subject for remarks some Alpine plants exhibited by Mr. Geo. Paul and Mr. Ware. He first called attention to the general characters of high Alpine and Arctic plants, in that they are dwarf in habit, mostly perennials, often with brilliantly coloured flowers, and sometimes characterised by a silky or woolly epidermis. These features are the result of the climatic conditions; as the same plants when grown in lowlands were often annuals, taller, and with less bright colours. The proportion of annuals continually decreases as the latitude or altitude increases, so that in Spitzbergen there are none. The dwarf habit has suggested the specific names of *muscoides*, i.e., "like moss," *nana*, i.e., "dwarf," &c. Certain families are especially well represented, as Primulacæ and Gentianæ, the former of which includes the original wild *P. auricula*, the basis of the hybrids forming the florist's flowers, of which a dried specimen was exhibited; our own *P. farinosa* and *P. scotica*, the former closely resembling its variety *P. f. Magellanica*, a specimen of which, brought by Mr. Darwin, showed the wide distribution of this species, as the only conceivable means of transit from the northern hemisphere was

along the Rocky Mountains and the Andes. Numerous species of Gentian are also characteristic of the European Alps, tall species as the medicinal *G. lutea*, four feet in height, being found on the lower slopes, and *G. glacialis*, about one inch high, occurring close to the perpetual snow. The Alpine Gentians are represented in Britain by *Gentiana nivalis*, at an elevation of 2,400–3,300 feet, on the Clova and Breadalbane mountains of Scotland, and *G. verna* of Westmoreland, &c., ascending to 2,400 feet. Other Alpine plants common to British mountains and of Switzerland are species of Saxifraga, as *Saxifraga oppositifolia*, &c.; *Dryas octopetala*, *Alchemilla alpina*, with silky leaves, species of *Lycopodium*, &c.

Prof. Henslow then explained how the same species are now only found in widely separated countries, as Great Britain, Pyrenees, Alps, Scandinavian Mountains, and in the Arctic regions. After the great Glacial epoch, when the climate of North Europe, including the British Isles, resembled the present condition of Greenland or Spitzbergen, the temperature became less severe, and Arctic plants (which had been driven southwards by the advancing ice and low temperature) were able to extend their distribution. The climate, however, continued to become more and more temperate; and as the ice all disappeared from our mountains the temperate flora spread westwards from the continent, while the Arctic flora, dying out from the lowlands, ascended, and became isolated upon the higher parts of the mountains, where they now exist. The land subsequently sank—where the German Ocean and the Channel now flow—and so the British Isles were formed, being cut off from the mainland.

DOUBLE FLOWERS.—Some double wood Anemones and furze supplied material for a few observations on the process of “doubling” as compared with the “symmetrical increase” of parts, which has now become a hereditary feature in the florist’s Auriculas exhibited. In the former there is a conversion of stamens and carpels into petals, with their subsequent multiplication. In the latter case some of, or all the whorls of the flower are regularly increased in the number of their parts; so that if five be the normal number, there may be whorls of sixes, sevens, or even eights. On the other hand, by insufficiency, instead of a superabundance of nourishment, the numbers might be reduced to fours and threes, or even twos. Thus fours to sixes

might often be found on the same corymb of Elder-flowers. Early-flowering Fuchsias were frequently in threes instead of fours, while Orchids and Irises might sometimes be found in twos.

HYBRID ORCHIDS.

By Mr. JAMES O'BRIEN, V.M.H.

[Read June 14, 1898.]

PUBLISHED in the Journal of the Royal Horticultural Society's Report of the Orchid Conference, 1885, we have the admirable lecture on hybrid Orchids by the best authority in the country, Mr. Harry J. Veitch; and in the recently issued number, April 1898, will be found an exhaustive paper, compiled by Mr. C. C. Hurst, entitled "Notes on Some Curiosities of Orchid Breeding." In the former paper the structure of Orchid flowers, the process of fertilisation, and other matters relating to the raising of Orchids from seeds are fully dealt with; and in the more recent paper a remarkable collection of curious facts and conjectures concerning the strange things brought about by cross-breeding are placed on record.

In the present paper, in view of the number of Orchid growers who attempt to raise hybrid Orchids from seeds, but who either fail altogether or get but very poor results, I purpose making a few brief remarks, dealing with the question from a cultural point of view. Having been honorary secretary of the Orchid Committee for a number of years, I have had the opportunity of seeing the many beautiful hybrids which follow each other in rapid succession, and I have been struck by the pointed examples which they give, and continually emphasise, of the good to be attained by diligent work.

One great advantage secured to gardens by the hybridist is the possession of a large number of showy plants, giving greater variety at all seasons, and in some cases filling in the periods between the flowering of the larger sections of Orchids, so that a continuous supply of flowers is possible. In thus extending the flowering season the garden hybrids have the advantage over the natural hybrids which are the progeny of species flowering in the same localities and at the same period, and consequently

flowering at a similar time to their parents ; whilst Orchids under cultivation may often be found in flower out of their proper season, and by this means the manipulator is able not only to effect crosses between plants naturally inhabiting totally different localities, but between species naturally flowering at different periods, of which the progeny generally flower midway between the proper time of flowering of the parents with a slight inclination mostly towards the season of the seed-bearing plant. Many instances of this kind might be given, but it will suffice to take the hybrids raised by Messrs. Jas. Veitch & Sons, using *Lalia Perrinii* as a seed-bearing parent, and which have brought us so many beautiful new plants flowering in the dead of winter.

But good and useful as the work of the Orchid hybridist has been, generally speaking, it has not supplied to us an altogether unmixed blessing, for in the great and easily worked genus *Cypripedium* a great many varieties have resulted either from unhappy crosses or from want of care in selecting the best varieties of the species used, the result being that the progeny are what may be regarded as weeds of their kind. The worst of it is that their originators do not regard them as weeds, and out of such failures spring a large proportion of the troublesome synonyms which cause so much anxiety to the members of the Orchid Committee, who get found fault with if they recognise the erroneous names under which the plants are shown, or call down the vengeance of the exhibitors if they change them. The trouble coming from this direction makes one long for the day when raisers of hybrid Orchids will be ready to admit that such failures are not worthy to be retained, and to destroy them after the manner customary among the raisers of other florist's flowers.

SEED-BEARING OF ORCHIDS IN THEIR NATIVE HOMES.

By the hybridist and by those who have studied in gardens the varied yet always elaborate structure of Orchid flowers the theory of their fertilisation by insects is invariably accepted, and anything said on the subject by those who have had the opportunity to observe the plants in a wild state is considered of great interest. So far as my experience goes, the observer in the tropics (with some few exceptions) invariably at the commencement either denies the agency of insects in fertilising the

flowers or is very sceptical on the subject; later they report that they have found instances of the operation being effected by insects; and ultimately they either believe in the subject as set forth by Darwin, or have little to say against it. So far as the good seed which takes the responsibility of reproducing the plant is concerned, I think there is little doubt that nature arranges for the fertilisation to be effected by insects, though in many cases the alternative of self-fertilisation is provided, but in such a manner as to be available only as a last resort.

Observers in the tropics are generally led to disbelieve in the agency of insects by the large number of seed-capsules which they see in some situations, which even in their early stages never furnished an instance of an insect employed in fertilising them (or rather of an insect effecting the operation while seeking its own sustenance) or of any sign of one having visited the flowers. I am convinced that a very large proportion of the seed-capsules of this kind have not resulted from fertilisation at all, but that they are capsules formed in consequence of irritation of the stigmatic surface by dust, or some other substance, and in a similar manner to what I have often produced on home-growing plants many years ago. I had what I consider remarkable proof in support of my contention from Mr. F. C. Lehmann when speaking with him on the subject last year. Mr. Lehmann remarked that, considering the great number of flowers produced by any species of Orchids over a given area, the number of seed-vessels generally speaking was very small, but that in very exposed situations, such as on isolated wind-swept hills, it was very common to find a quantity of plants in the bleakest spot covered with capsules, while in sheltered situations the same species would give but few fruits. I have no doubt that in these occasional instances the capsules are invariably produced by dust or grit being carried to the stigmatic disc, and that they contained no good seeds; but Mr. Lehmann promises to test the matter, and we may hope for further information on the subject. I think it very probable that what are known as bad varieties or a bad strain of any species of Orchid coming from a particular locality may have originated at some remote period from dearth of insects to effect fertilisation, and consequent resort being had to the alternative of self-fertilisation the progeny of which degenerate; or from the degeneracy of the subjects so heavily

drawn upon by the production of capsules resulting from false fertilisation by the irritation of the stigma by foreign bodies such as grit or fine vegetable deposit, of which class the seemingly prolific colonies of plants in exposed situations mentioned by Mr. Lehmann doubtless are.

Comparatively few as the good seed capsules are in a general way in the native habitats of Orchids, the supply of seeds, were even a small proportion of them to germinate and make mature plants, would be sufficient to stock the whole of the countries which they inhabit; and yet we are told that some of the species, apart from the raids of the plant collector and destruction by the land developer or plantation maker, have had work to maintain their places in creation. Lamentable as the fact is, the raiser of garden hybrids who is continually complaining that the proportion of plants he secures from the quantity of seeds sown is very small may console himself that his proportion of mature plants is in many cases far greater than in nature, and that the causes which militate against the more profuse supply of plants are about equal in effect, though different in detail. In their native habitats each species of Orchid is very partial as to the locality in which it will grow, and hence when the thousands of minute seeds are scattered those which fall near fall into quarters already well inhabited, and those which are carried beyond the zone find their surroundings unsuitable to them. In any case but very few lodge where they can germinate, and even after germination the climatic changes and other causes prevent all but a small proportion from attaining maturity.

The garden hybridist may sum up his disappointments under various headings.

First, he can only do his best to imitate nature, in the place he has to attempt to raise his seedlings in, and in the arrangement of the temperature, &c. Secondly, I am convinced that a large proportion of the seeds sown have never had the power of germinating. And thirdly, the long and dreary winter during which the sun is absent or obscured, and fogs often prevail. These and other unpreventable matters have to be dealt with as best one can. To the careless they bring absolute failure; but the thoughtful and diligent succeed in the end.

Crosses are effected between widely differing species and genera, and in some instances plants have been obtained from

very unlikely couples ; but on the other hand many have defied the wiles of the hybridist. Among these may be mentioned *Lælia* (*Brassavola*) *Digbyana*, which, although useful as a pollen agent, yields no seeds itself so far as yet known, not even the fine, dust-like husks often produced by other unsuccessful crosses. There are, of course, many causes why the seeds of some crosses effected between widely differing parents should be unproductive, and the wonder is that so many strange hybrids have been successfully raised. One cause probably arises from the difference in the time required from pollination to fertilisation, and to maturity, by the seeds of the plants used in effecting the cross.

To begin with the seed capsule, we will suppose that the operation of hybridising is understood by all who care to closely examine the flowers, or that they can refer to what has been already written on the subject. As soon as the seed-vessel becomes heavy it should be supported by a piece of matting or tape to prevent it bending abruptly, and thus interfering with the flow of the sap.

It is the general belief that the capsules of cultivated plants take a longer time to mature, or rather to show that they are mature by splitting, than they do in a wild state; and it is also thought that therefore the seeds contained in them are often perfect, and quite ready to sow, long before the pods burst. This is a reason why no time should be lost in sowing the seeds, and some of the most practised operators say that immediate sowing should be made (or at least within a few days after the removal of the capsule), no matter at what season the ripening takes place, and that the risk of retaining the seeds until spring is greater than that of sowing them in winter.

As to the manner of sowing, Mr. John Seden, V.M.H., our oldest and most experienced hybridist, who has worked both head and hands in Orchid hybridisation for over thirty years, says that, notwithstanding many experiments with a view to getting a more certain means both for raising and recording the cross than his old one of sowing the seeds on established plants of a similar nature, and in a temperature suitable to plants of the class from which the seeds resulted, he has never yet been able to find a better or indeed so good a plan. A suitable plant is selected, one suspended being preferred if possible, the material in the pot or basket being sweet and sound, and if there is any

growing sphagnum in it it is clipped back; the seeds are sprinkled over the surface, the record label attached corresponding with the entry in the stock-book, and the plant is watered as usual, but with care not to wash the minute seeds off, and rain-water is always used for hybrids in all stages. Many seeds are wasted of course, as they would be if self-sown in the tropics, and with a view to the inevitable in this direction nature has supplied the capsules with innumerable seeds to meet the risks.

One of the most fruitful causes of failure in raising hybrid Orchids is that low forms of vegetation, generally known to the gardener as "Moss," are apt to spread over the surface of the material on which the seeds are sown, or on which the tiny little fleshy discs tell of the first step towards obtaining plants having been successful. In such cases the whole of an interesting cross has often been lost, and to endeavour to escape it the energies of all Orchid hybridists are employed. The fact that these low forms of vegetable life always, and naturally, appear on freshly prepared surfaces is the great argument against making up pots of peat and other Orchid potting material on which to sow the seeds when ready; for in such cases, unless some means to prevent it has been resorted to, the Moss gets ahead of the germinating seeds and young plants, and destruction results.

Sterilisation, by either baking or pouring boiling water over the peat to be used for making up the seed pans, is generally practised by those who elect to sow them in pans or pots not already containing plants, and of the two methods probably boiling, or the use of boiling water, is the better, for by that means the fibre is not rendered brittle, and liable to pass into very fine soil, which the seeds do not like, as it is by the process of baking. In making up the seed pans care should be taken that both the crocks used and the pots themselves shall be perfectly clean, and in filling in the material the pots should be crocked half-way up, and the finer portions of the peat placed on the top layer on which to sow the seeds.

Sphagnum Moss should not be used or very sparingly, so far as my observation goes, and the pots on which the seeds are sown and the young plants are growing should either be suspended or placed on a shelf near the glass of the roof. A Wardian case is advocated by some as a means to hasten and ensure the quick germination of the seeds. Where such a contrivance is used I

think a skeleton frame, like a propagating case, is best, in which the covering is supplied by narrow sheets of glass resting on the front of the frame and on the central bar of the ridge (or back portion if not a span), as the ventilation of such a contrivance is much better than where a sashed frame is used, and in such a one it is possible to secure a healthy atmosphere without drips even when closed. The risk of using a frame is that, although advantage may be secured at the commencement, if the young plants are left in too long, or kept too close, the whole of them may perish in a very short time; and this fact seems to bear out Mr. Seden's experience, that the old plan of sowing the seeds on already existing plants is the safest in the end.

But with the germinating seeds, or with the first budding young plant secured, the hybridist's troubles are not over, for if left too long in the position they were sown in, they drop off one after another. Hence, as soon as they can be pricked off into pans or shallow suspending Orchid pots filled with sterilised material the better, and as soon after the next trouble of making the first root has been passed, each should occupy its own tiny pot, which should be fixed or plunged, several together, into suspending pans, or placed on the staging in a suitable house, each at all stages bearing its record ticket of celluloid.

When once well-rooted single plants are obtained, it is only a question of time, care and convenience until the plants gladden the eyes of their originator with their flowers, but during all this time they have to run the same risks as the established Orchids do, and consequently it is no wonder that some of them, like some of the imported species, fail.

One fruitful cause of loss among hybrid Orchids (or indeed among Orchids generally) is the too free use of the ventilators in spring and early summer, and especially the top ventilators, to nail down which I am sure in some collections would work an amazing improvement in the plants contained in the houses. I commonly see when visiting Orchid collections in spring, and often during the prevalence of cutting east winds, the top ventilators thrown open in the most unreasonable manner, and at the same time the boilers are being driven to keep up the heat. If the artificial heat is kept down and the top venti-

lators kept close the atmosphere in the house may be kept at the proper temperature, and it will assist vegetation instead of destroying it. It should be remembered that in every glass-house there is always top ventilation through the laps of the glass, and, generally speaking, I think a one-foot swing ventilator at each end of the house would meet the case, and not give the opportunities of abuse which the present system of top ventilation does. I am sure that many hybrid Orchids, and also many rare species, have departed from this cause alone.

Once well established, however, the home-raised Orchids have a decided advantage over the imported plants, in that they are much less liable to be affected by our long spells of dull weather and other climatic peculiarities.

THE ADVANTAGES TO GARDENERS OF SOME KNOWLEDGE OF VEGETABLE PHYSIOLOGY.

By the Rev. Prof. G. HENSLow, M.A., F.R.H.S., V.M.H.

[Substance of a Lecture delivered at the Society's Gardens, Chiswick, June 15, 1898.]

INTRODUCTION: WHAT IS VEGETABLE PHYSIOLOGY?—It is the study of the natural history of living plants.

To secure health in a human being a doctor must understand the structure, functions, and requirements of every organ of the body; *e.g.* the lungs are so made as to absorb oxygen from the air for breathing, by which life is kept up; and one might make a somewhat analogous statement of a leaf—that it is so made as to absorb carbonic acid gas, by which plant structure is built up. Similarly, with regard to the digestive organs, a doctor must know the nature of all the organs of secretion, the relative values of various foods and how they can best secure the growth and development of the body as well as restore its waste. Similarly, to understand how a plant may grow well and thrive it is necessary to know the structure of its organs or members, what they do and what they require.

Some persons fancy that they can draw a sharp line between practice and science, or between cultivation and physiology. Such, however, is altogether a mistake; for all practical

gardeners are more or less scientific physiologists, though, perhaps, without knowing it. For, it is just because florists and horticulturists do succeed so wonderfully well in growing plants that they have discovered for themselves what their plants require; without, it may be, exactly knowing the why and the wherefore in every case. Their profession might, indeed, be called "practical vegetable physiology."

What science can add to the gardener's knowledge and experience is, on the one hand, a full description of the minute anatomy of plants, discovered after long and careful microscopical examination of them; and secondly, the several functions of the different tissues, and thence the functions of all the plant organs which are built up of those tissues.

If, then, a gardener understands this, it is for him so to place his plants, and so to feed them, as to secure to the fullest possible amount the complete activity of each and all the plant organs.

It must always be remembered that no absolutely perfect conditions can be secured; but the cultivator can always endeavour to obtain approximately the best; and these the grower can often find out where a scientist has no opportunity of telling him. Thus, *e.g.*, all green plants require light; but the amount that each requires as best for it is not the same for all. This the *Aucuba japonica* illustrates very well; for the leaves on the surface of a bush, and most exposed to light, are much more spotted with yellow, which increases with a prolonged intensity, than are the leaves more deeply situated within the bush. These are always of a darker green and have fewer spots. Conifers, too, often show a marked susceptibility to too strong a light, when the colour of the foliage turns to a yellow green.

The adaptations of plants to their surroundings should be studied much more than has been the case. Thus, when collectors introduce new plants from foreign countries, they should always record accurately in their note-books the conditions under which the plants were growing in their native homes; not only the nature of the soil, but the amount of light or exposure to the sun, the amount of moisture or its absence, &c.; because the natural and healthiest conditions of plants in the wild state are solely due to their having become thoroughly adapted to those conditions; and the nearer the cultivator can

imitate them, it is obvious, as a general rule, the more healthily will they grow. Thanks, however, to this very power of self-adaptation, they can accommodate themselves within limits to their new environments in a hothouse, greenhouse, or open border in England. Still, the more that is known about their habits in nature, so much the better for the cultivator. Thus, it is said that when *Aucuba japonica* was first introduced from Japan, it was grown under glass; but a stray plant having been thrown away was discovered to have lived through a severe winter, so that it has ever since been grown in the open. A gardener thus finds by experience, often after many mistakes—which cost money—how to grow foreign plants; but his knowledge may have been acquired laboriously; and he may even then not know *why* it is best to do this or that for his plants. It is here that a knowledge of physiology can sometimes step in and tell him; for it is the province of science to investigate into *causes*. Nature, however, and especially the department of “life,” is so obscure that no scientist has ever probed all her secrets to the bottom, and probably never will be able to do so; until she tells us how it is that life-forces can issue out of food. However, no one can cultivate a plant at all without knowing something of its physiological requirements to enable it to live and thrive; and just so far as the practical man succeeds, so far is he acquainted with the main facts of physiology. The question is, therefore, Does he know enough?

ILLUSTRATIONS.—It will not be amiss to review the organs of a plant in order to consider briefly their functions in a general sort of way. It will then be seen that there is really no great mystery in physiology after all. In order to illustrate the preceding remarks let us commence with a few physiological observations on germination.

Germination.—Seeds must be moist throughout. There must be a proper temperature; and a free circulation of air. The first and second are necessary in order that the various chemical changes may take place within the seed; the third is required for respiration. This shows the importance of avoiding too great a depth or too wet a soil. The radicle, on protruding, points earthwards. This is due to gravity. If the radicle be placed in a horizontal position, gravity acts on the tip; but the influence is conducted to a certain distance behind it, where the

curvature downwards at once commences. If the tip be broken off, gravity ceases to act upon the root, and fresh roots have to be made, and consequently dangerous delays may occur in transplanting seedlings.

Roots and their Functions.—The absorbing surface is confined to a certain but short distance immediately behind the apex, and consists of the delicate epidermal surface with its root-hairs if present. This is easily proved by a simple experiment of placing a Radish plant with its tip only in water; the leaves, &c., will keep quite fresh. If, however, it be so bent, *e.g.*, in a tumbler of water, as to submerge the greater part of the root, leaving the tip outside, the foliage will soon wither. All these facts demonstrate the vital importance of keeping as many as possible of the extreme tips of the roots intact, when transplanting herbs or shrubs. Another physiological fact about roots is their occasional production of buds. Roots and stems are fundamentally the same thing; but, as a rule, stems produce buds, because they grow in air and light. Roots, as a rule, do not; but if they be superficial, as in many trees, they frequently assume this function. Many plants have acquired the habit of doing it habitually. Elm trees by a road side in time make a perfect hedge over a superficial root. Raspberry roots have the permanent habit of throwing up buds. So that if buds are required from roots, they can be stimulated to bear them, as gardeners have discovered it to be possible in Peaches, *Machura*, *Paulownia*, &c.

Leaves and their Functions.—The two chief functions specially characteristic of leaves and other green parts are transpiration and assimilation; for leaves are, so to say, the breathing, digesting, and perspiring organs of plants. To carry these functions on satisfactorily, cleanliness of the surface is desirable, for they are executed by means of minute pores, or stomates, in the epidermis. These two functions depend upon light; but before assimilation can be carried on at all, it is necessary for the leaf to be green. This can be effected only by light in ordinary plants. Light is compounded of many rays—such as the invisible, but sensible, heat rays, the ultra-violet invisible rays, and the intermediate coloured rays visible to our eyes. These range from red through yellow, green, and blue to violet, with intermediate mixtures. It is found that light of any colour will

cause the green chlorophyll to appear, but unequally so. The use of the chlorophyll granules is to decompose carbonic acid gas absorbed from the atmosphere, of which it forms, on the average, about one twenty-fifth part per cent. From this the carbon is retained for making tissues, while the oxygen is liberated. It is found that only certain parts of the solar spectrum are specially concerned in this process, though probably others assist. Such are some of the brightest parts of the spectrum, as well as some in the blue portion; but any specially coloured glass taken *alone* is injurious to plant life. The ill effects can be seen by growing Lettuces or other plants in frames under coloured glasses, when it will be found that the red and yellow glass tend to elongate the stem, as takes place in the dark. Green glass proves to be the very worst colour of all. As examples of a mistaken view, Mr. Decimus Burton constructed the Palm-house of Kew with a glass slightly tinted green, according to Dr. Daubeney's advice. This was with the idea of reducing the glare. Fortunately the tint is so slight as to do no harm if it does no good. It proved otherwise with the Fern-houses at Kew. The green glass of a deeper tint with which the Ferns there were covered, proved to be so injurious that it has been replaced with ordinary transparent glass. The fact is that plants have been attuned by Nature to the whole body of light, and it is only a question of its being either too intense or insufficient. If, therefore, the light has to be subdued, it must be done by some white material that reduces the amount by reflection, or otherwise, without decomposing the light itself. Such are the suggested practical results from physiological experiments.

Transpiration, though carried on by the colourless living protoplasm everywhere throughout the plant, is intensified by green chlorophyll, and like assimilation is largely dependent on certain rays. It must be distinguished from evaporation which results from heat. All dead and moist substances will evaporate, but only living plants transpire. As this function is most active when there is much foliage, it is easy to see how undesirable it is to transplant herbaceous plants when in full vigour, as the check to absorption by the roots can only be overcome by supplying a superabundance of water until the plant has established itself.

Flowers.—Coming to the reproductive organs, the process of

pollination is now so well understood by gardeners that one need not dwell upon this, except to observe that it was by no means certain fifty years ago which organ was the male and which the female. It required much labour and skill by microscopists to determine that the embryo was a result of impregnation of a germ-cell within the ovary of the pistil by the pollen, and not formed in the pollen-tube itself, as Dr. Schleiden thought. In crossing flowers, as also in grafting, something must be known of the affinities of plants, for both processes will fail if the experimenter transcends a certain amount of affinity. Thus, I have known a gardener graft a Rose bud on a Black Currant, under the impression that he could get a black Rose; but as they do not belong to the same family the chance of success was very remote and completely failed. On the other hand a gardener may make a lucky hit, as was the case in grafting *Garrya elliptica* on *Aucuba japonica*, for it was not then known—except to Sir J. D. Hooker—that they belonged to the same family. *Garrya* being a curious type had only just before been placed in the same family when the “Genera Plantarum” was published. It was not, therefore, surprising to meet with success; but the experimenter had no grounds for believing it would succeed, or for anticipating the happy result.

The few preceding observations and illustrations will be sufficient to show that some knowledge of vegetable physiology is absolutely necessary for a practical horticulturist, and a short course of study will soon awaken the desire to know more. Having learnt of what a plant consists, and what it requires, the gardener must then exercise his judgment and skill in trying to see how he can best supply the conditions to secure its healthy growth and propagation.

OBSERVATIONS ON SOME PLANTS EXHIBITED.

By the Rev. Prof. G. HENSLow, M.A., V.M.H., &c.

[June 28, 1898.]

CAMPANULAS.—A fine collection of these plants showed how the extra structures of the flowers were made, viz., as follows:—
(1) With a second corolla (catacorolla) only; (2) calyx, as a

tubular corolla; (3) calyx, as a "saucer"; (4) stamens, petaloid; (5) various combinations.

SWEET PEAS AND SNAPDRAGONS.—These afforded good instances of a very great variety of colours—the result of interbreeding alone, without any specific crossing whatever.

PHÆNOCOMA PROLIFERA.—Fine flowering plants exhibited by Mr. Balchin, of Hassock's Gate, and some *Rhodanthes* illustrated the so-called "Everlasting" Flowers, with coloured or white and scarious bracts to the involucre. Mr. Henslow observed that the little yellow European Everlasting was confounded by the ancients with the purple-flowering plant known as *Amarantus*. Dioscorides observed that some people call the Helichryson (the true Everlasting) by the name *Amarantos*, a word signifying "not decaying," this word being still used for the purple-flowered "Love-lies-bleeding," of the Order *Amarantaceæ*. The phrase "an inheritance . . . undefiled, and that fadeth not away" (1 Pet. i. 4) is in Greek *ἀμάραντος*, the name of the Everlasting Plant. Pliny described the use made of these flowers in his day—in forming chaplets for the statues of the gods; the origin, in all probability, of the circlets of *immortelles* used so largely on the Continent for funeral decorations. The foliage of the *Phænocoma* is identical in form with that of *Thuia*s, high alpine *Veronicas* of New Zealand, and of *Salsola Pacho*i of North African deserts, &c., showing how excessive drought brings about a similar adaptation in the foliage of very different plants, but growing in similar though widely separated countries.

CHAMÆROPS FORTUNEL.—A fine male inflorescence of this Palm led the lecturer to speak of the sexes of plants, that of the Date being well known to the ancients. Though the knowledge of the uses of stamens and pistils was lost in the Middle Ages, it was rediscovered in the seventeenth century, if the current belief be true that it was Sir T. Millington, Savilian Professor at Oxford in 1676, who maintained it; but both Grew and Ray soon after seem to have been quite aware of it; while Linnæus, of course, based his classification upon it.

HYBRID ROSE.—An interesting hybrid, supplied by Mr. Geo. Paul, was that of *Rosa canina*, *grandiflora* × *R. Indica*. The hybrid had the stem and foliage much like those of the Dog Rose, but more glossy and tinted with red. The buds, with an orange

tinge, bore witness to the "Tea" character. The flowers are large and semi-double.

ROSA SANCTA.—This was an interesting Rose, having been introduced from convents in Abyssinia, and is the same as has been discovered dried in chaplets found in the tombs of Egypt; so that it was probably introduced and cultivated there from the earliest antiquity. The only wild Rose in Egypt now is *R. involucrata*, Roxb., white-flowered, and with obovate leaflets. It still grows semi-wild in a garden on Rhoda Island, Cairo.

PHILADELPHUS CORONARIA × *P. MICROPHYLLA*.—A hybrid supplied by Mr. Veitch. It has flowers intermediate in size borne on slender branches, with small leaves, more nearly resembling *P. microphylla*.

CAMPANULA MIRABILIS.—This is a new and remarkable species, introduced by Mr. Jackson from the Caucasus. Its round, sub-fleshy leaves with ciliated margins, &c., indicate a probable habitat of a cool and dry mountainous environment.

BLACK CURRANT × *GOOSEBERRY*.—A fruiting spray was supplied by Mr. Culverwell, of Thorpe Perron, Bedale. It is a remarkable hybrid, showing fruit with all the habit of the Black Currant, but green and resembling small Gooseberries. There are no spines of the Gooseberry, nor smell of the Currant, the hybrid partaking partly of some of the parental characters but losing others.

LUPINUS POLYPHYLLUS.—A new yellow-flowered seedling, probably an accidental hybrid, of considerable beauty, was shown by Mr. Kelway.

THE NEPENTHES OF AUSTRALIA.

SINCE the publication in our JOURNAL of Mr. Veitch's paper on *Nepenthes* ("Journal Royal Hort. Soc.," vol. xxi. p. 226) we have been in correspondence with Mr. L. A. Bernays, F.R.H.S., a Member of Parliament in Queensland, and also with Mr. F. Manson Bailey, the Government Botanist at Brisbane. Mr. Bernays very courteously draws attention to the fact that there are some described and some as yet undescribed species of *Nepenthes* in Queensland; and Mr. Bailey most kindly sends descriptions and drawings of five. Writing under date of

Brisbane, February 14, 1898, he says :—" Mr. Veitch makes no mention of the Queensland species *Nepenthes Bernaysii*, described by me in the 'Proc. of the Linnean Society of N.S. Wales,' vol. v., page 186. He contents himself with the remark, 'There is one in North Australia.' Now I believe that there are several as yet unrecorded species waiting for the collector on Cape York Peninsula. During my visit to that part of the colony in June 1897, I was enabled, through the kindness of Mr. F. L. Jardine, to describe two new species, which brought the number of Queensland species up to four, and I have since received specimens of one or two which may also prove fresh.

"It is generally supposed that the homes of these curious plants are the unhealthy, hot, humid parts of the globe—conditions not to be met with in any part of Australia; in fact, it would be difficult to find a more healthy locality than that in which our Australian pitcher-plants grow. The elevation above the sea-level is also but little. I merely mention this so that European growers may have some idea as to which part of the hothouse our plants should be placed in when they receive them. In passing I may remark that our Australian species seem easy to transplant, for I have seen plants which have been sent down from Cape York to Brisbane in a most careless manner, after being placed in a greenhouse, strike root and grow vigorously.

"F. MANSON BAILEY."

In a subsequent letter, dated June 30, 1898, Mr. Bailey continues :—" In addition to the four already published, I have received from Mr. Jardine specimens of perhaps two others. These, however, do not in my opinion furnish sufficient material for drawing up descriptions good enough for publication. The species of this genus in Queensland are, so far as at present known, all found on the northern part of Cape York Peninsula, say 1,300 or 1,400 miles from Brisbane. They are a long distance from Somerset (where Mr. Jardine resides), and after being gathered have to be brought to his residence by pack-horse, so that they are often much injured by the journey; and if the inflorescence is not attached to the plant, from which I draw up the diagnosis, I can take no notice of them, for in this genus the distinction is usually very slight in different species. I enclose a sketch (natural size) by our artist, Mr. F. C. Wills, of

one (of the two just referred to), which I think there can be little doubt is as yet undescribed. The specimens were unfortunately lost off the pack-horse, the single pitcher only being saved by Mr. Jardine having placed it in his pocket-book when gathering the specimens. This species I intend to name *N. Alicæ* (fig. 31), after Miss Jardine, who, like her father, takes a deep interest in our indigenous plants.

"F. MANSON BAILEY."

He then adds the following descriptions:—

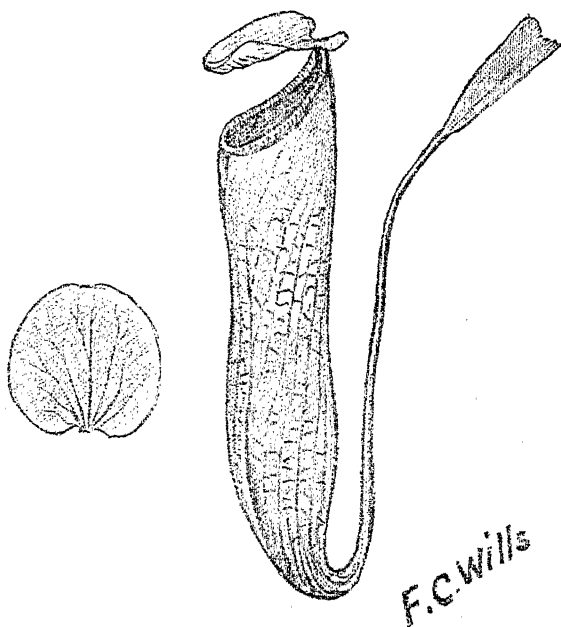


FIG. 31.—*NEPENTHES ALICÆ* (Bail.).

Order NEPENTHACEÆ (THE PITCHER-PLANT FAMILY)
NEPENTHES, Linn.

Table showing the differential characters of the Australian species:—

N. Kennedyi. Fig. 32.—Stems long, climbing. Pitchers inflated below the middle, without any crest on the anterior

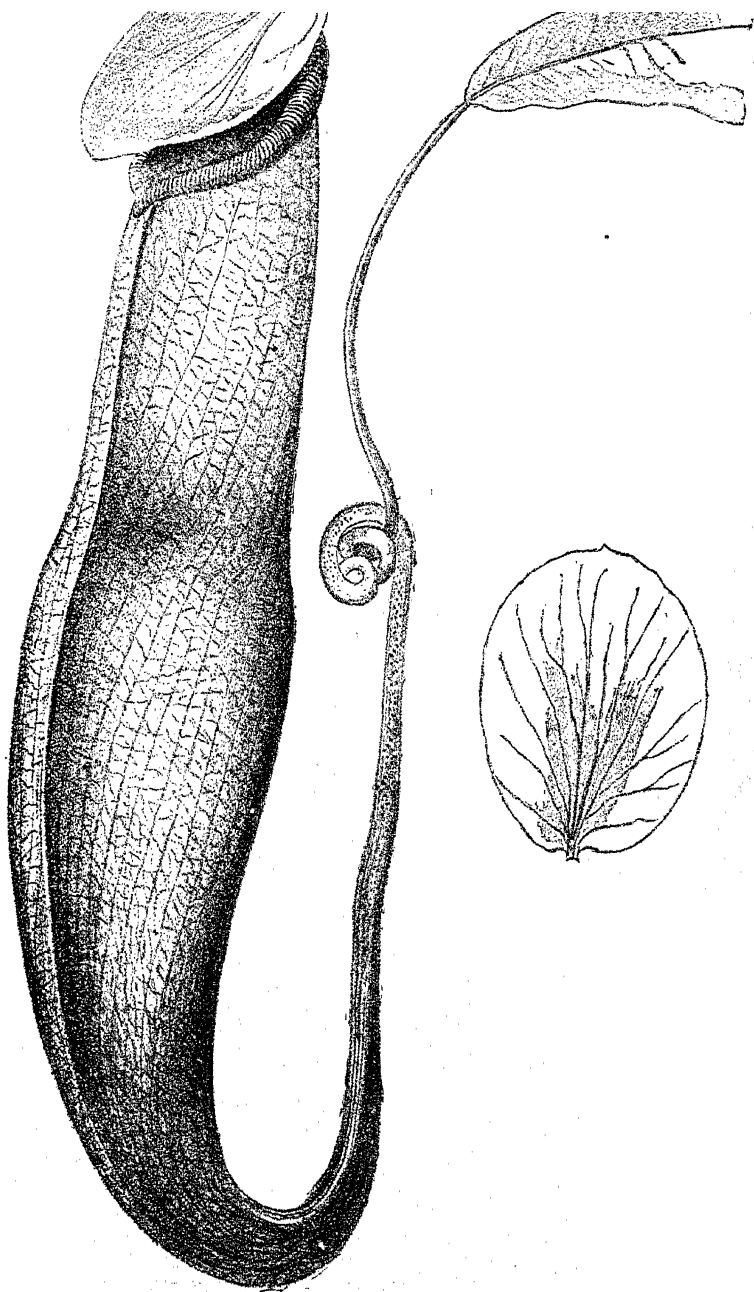


FIG. 32.—*NEPENTHES KENNEDYI* (F. v. M.).

ribs; the naked portion of costa forming a curl about the middle.

N. Bernaysii. Fig. 33.—Stems short, climbing. Pitchers inflated below the middle, the anterior ribs winged with distant coarse ciliæ or weak bristles along their margins; naked portion of costa without a curl.

N. Jardinei. Fig. 34.—Stems not climbing. Pitchers inflated below the middle, anterior ribs with a narrow non-crested wing; naked portion of costa without a curl.

N. Rowanæ. Fig. 35.—Stems stout, not climbing. Pitchers enlarging from the base upwards, thus forming a wide orifice; the anterior ribs with scarcely any wing; naked portion of costa without a curl.

N. Rowanæ, Bail. (n.sp.) Fig. 35. (After Mrs. Rowan, a painter of Australian flowers.)—Pitchers, when fresh, beautifully marked with reddish-purple, about 6 in. long, shortly and abruptly curved at the base, from which it widens upwards, attaining a width at the top of about 3 in., prominently marked on the outside by oblique parallel nerves and reticulate veins; anterior ribs hard, scarcely winged, much nearer together than in *N. Jardinei*; orifice very wide, posterior spur flat, tomentose; peristome 3 or 4 lines broad, with close transverse veins; operculum nearly orbicular, about $2\frac{1}{2}$ in. diameter, with numerous circular glands on the inner face.

From specimens to hand from Mr. F. L. Jardine, of Somerset, I am enabled to add the following to the above description.

Stems stout, erect, 2 or 3 ft. high, hoary tomentose. Leaves numerous, coriaceous, prominently decurrent upon the stem, falcately recurved, tapering towards the base into a broad petiole, including this tapering base or broad petiole about 11 in. long, the broad centre about $1\frac{1}{2}$ to $2\frac{1}{2}$ in. wide; longitudinal nerves 6 on each side of costa, the cross-veins wavy but not very prominent from the thickness of the lamina, the naked portion of costa or stalk of pitcher somewhat flattened, 7 to 10 in. long, without a curl, straight and cane-like. No flowers or fruit yet to hand. Hab.: Somerset, Cape York Peninsula, *Frank L. Jardine*.

The two specimens sent by Mr. Jardine as *Nepenthes Kennedyi*, in the box with *N. Rowanæ*, proved to be *N. Kennedyi*

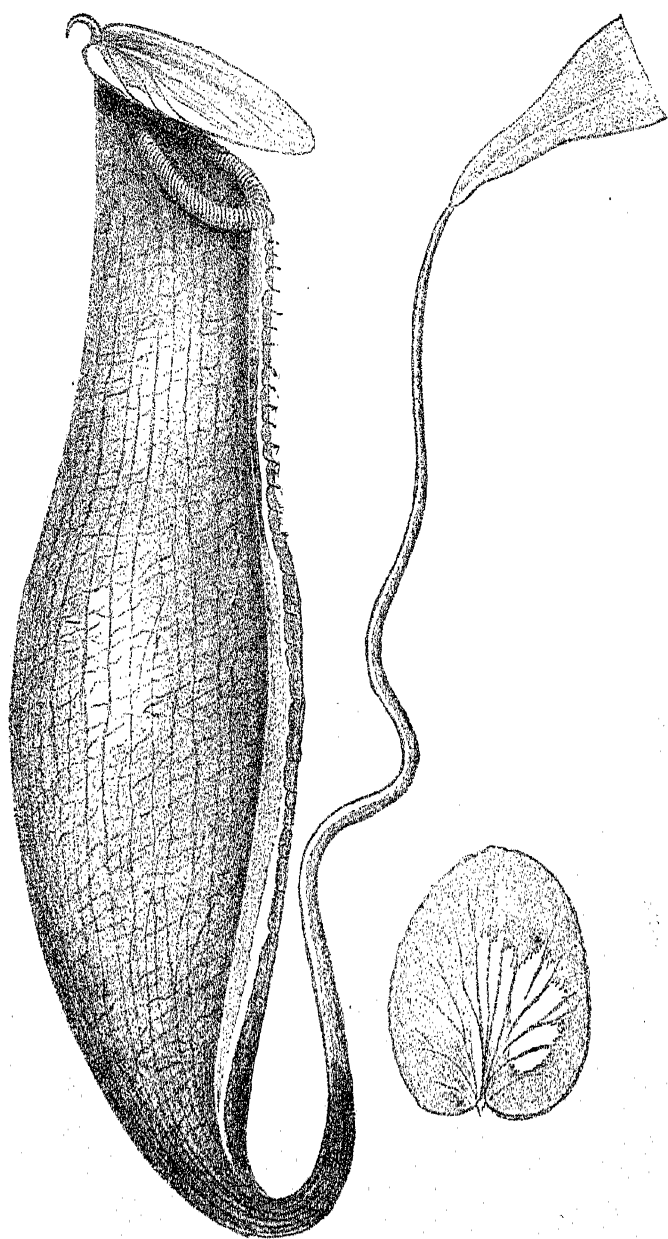


FIG. 33.—*NEPENTHES BERNAYSII* (Bail.).

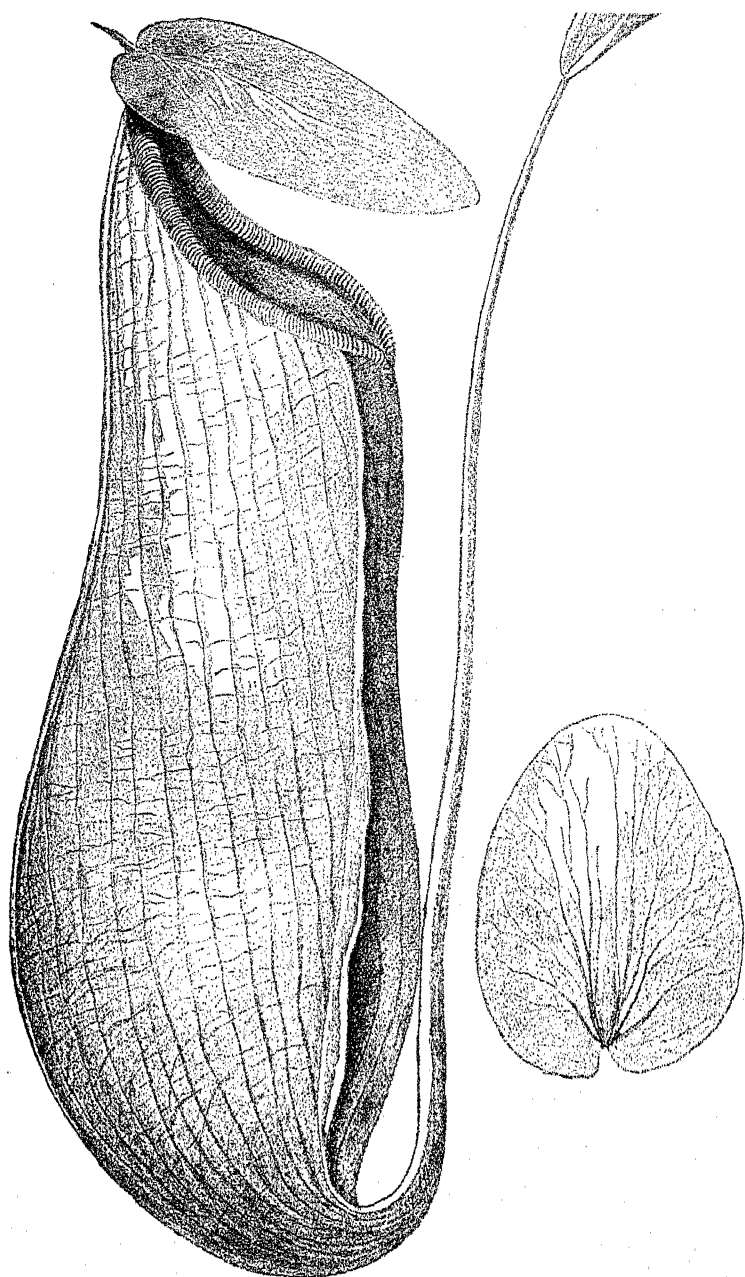


FIG. 34.—*NEPENTHES JARDINEI* (Bail.).

(fig. 32) and *N. Bernaysii*. With these specimens were also, in a separate paper labelled *N. Kennedyi*, three specimens of male inflorescence; but as Mr. Jardine placed the two species above mentioned as *N. Kennedyi*, I cannot say to which they may belong. The peduncles of these are most certainly not attached to the stem, like I found those of the female inflorescence of that species, and described in Syn. Ql. Flora; and up to the present no male inflorescence has been described. I am inclined to consider those now forwarded by Mr. Jardine as belonging to *N. Bernaysii*, of which neither inflorescence is known, and under which species a description is here given provisionally:—

N. ? Bernaysii, Bail. Fig. 33.—Peduncles 4 to 6 in. long, shortly tomentose, more or less plainly striate. Raceme 5 to $7\frac{1}{2}$ in. long, flowers (male) rather crowded. Pedicels slender, 5 lines long, tomentose. Perianth with 4 reflexed oblong-cuneate segments, about half as long as the pedicels, glabrous and dark-coloured on the face, tomentose on the back. Staminal column about as long as the segments; head of anthers about $\frac{3}{4}$ -line diameter.

N. Jardinei, Bail. (n. sp.) (After Frank L. Jardine.) Fig. 34.—Stems several, rather stout, arising from a hard knotty rhizome, 2 to 3 or more feet high; not climbing, sometimes branched, clothed with leaves mostly bearing pitchers; the young growth more or less clothed with soft hairs, the shorter ones of which are usually stellate, the longer ones frequently simple. Leaves decurrent and slightly stem-clasping; petiole 2 in. long winged; lamina 8 in. long and from 2 to nearly 3 in. broad in the middle, tapering towards each end; midrib at first purplish-red, longitudinal nerves on each side of midrib usually 6; the narrow portion or stalk of pitcher about 6 in., without the loop of *N. Kennedyi*, F. v. M.; pitcher 5 to 7 in. long, $1\frac{3}{4}$ in. diameter near the top, enlarging in the lower half to about $2\frac{1}{2}$ in., with numerous prominent longitudinal nerves and reticulations; anterior ribs with narrow red wings; orifice wide and arising towards the spur; peristome narrow, about 1 line broad, with numerous transverse veins; posterior spur recurved; operculum elliptical, about 2 in. long, with numerous various-sized circular glands on the inner surface; inside of pitcher more or less spotted or stained purplish-red. Racemes dense, 4 to 8 in. long in the males, but shorter in the female racemes;

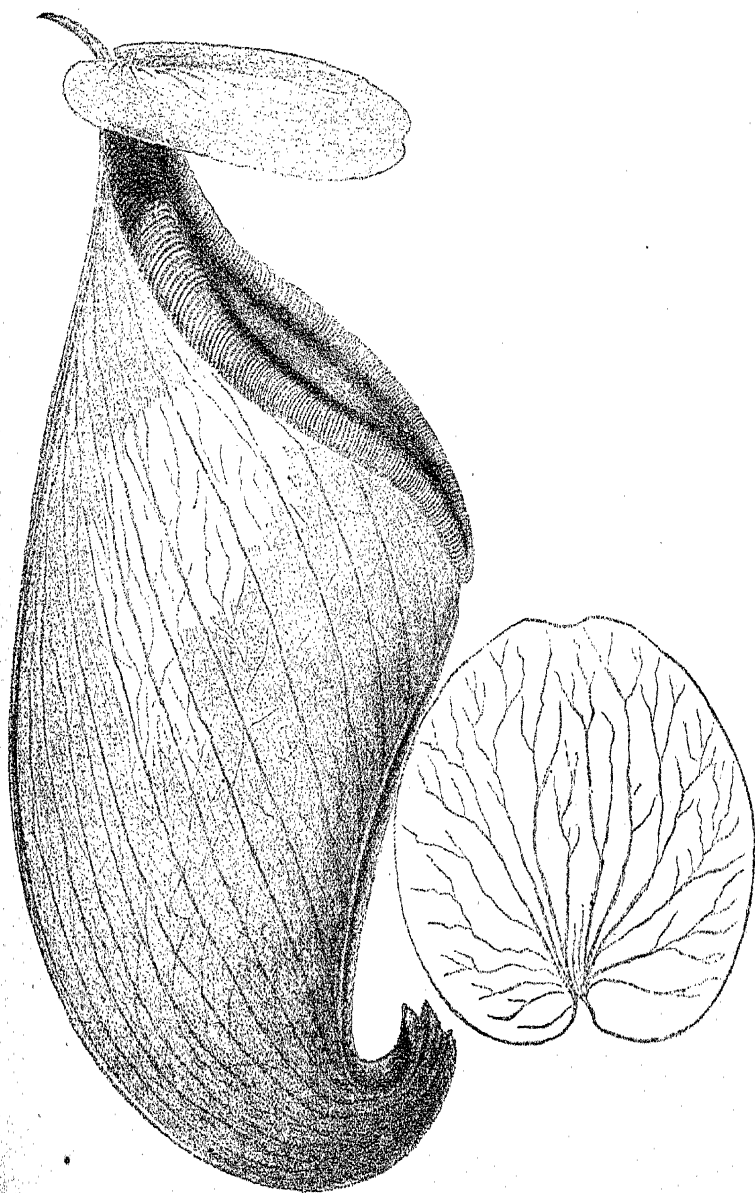


FIG. 35.—*NEPENTHES ROWANÆ* (Bail.).

male perianth of 4 oval segments, about 3 lines long, reflexed upon the pedicel, united and forming a cup at the base; staminal column about the length of the perianth-segments, head of anthers 1 line diameter. Female perianth like the male, stigma sessile. Capsule coriaceous, $\frac{3}{4}$ -in. long, 4-valved, each valve crowned by a lobe of the stigma. Hab.: Somerset, Cape York Peninsula, *Frank L. Jardine*.

REPORT ON RASPBERRIES, CHISWICK, 1898.

A collection of fourteen varieties of Raspberries were procured from Messrs. Geo. Bunyard & Co., Maidstone, in the autumn of 1896. They were all planted in the coolest and most moist portion of the garden, and with one exception (No. 2) the whole made very good growth and bore excellent crops of fruit in 1898. The plants have also been entirely free from any insect pests.

F.C.C.=First Class Certificate.

1. Baumforth's Seedling.—Five medium-sized leaflets on each leaf stalk. Fruit produced in moderate clusters; berries nearly round, deep crimson in colour, fair in flavour. A moderate grower and bearer, with comparatively few spines on the wood.

2. Beaconsfield. F.C.C. 1883.—Not a success at Chiswick, growing and cropping badly.

3. Blanche Souchet.—Five rather large leaflets on each leaf stalk. Fruit produced in small clusters; berries round, yellow in colour, good flavour. A moderate grower and bearer; wood thickly studded with spines.

4. Carter's Prolific.—Five large broad leaflets on each leaf stalk. Fruit produced in big clusters; berries large, bluntly pointed, deep red in colour, rather sweet in flavour; a sturdy dwarf-growing variety and heavy cropper. Rabbits are fond of eating the woody parts of this variety in severe winter.

5. Four Seasons' Yellow.—A dwarf-growing yellow-fruited variety, valuable for its fruiting in the late autumn. During October and November, 1897, it produced a heavy crop of very sweet fruit.

6. Hornet. F.C.C. July 9, 1889.—Five large leaflets on each leaf stalk, the lobes being sharply pointed. Fruit produced in great clusters; berries round, very large, deep crimson colour.

A strong grower and heavy bearer, with a small quantity of spines on the wood. The sweetest Raspberry in the collection.

7. Improved Falstaff.—Five leaflets on each leaf stalk, sharply pointed. Fruit small in cluster and berry, round, deep red, and of fair flavour. A moderate grower and bearer.

8. Northumberland Fillbasket.—Five rather small leaflets on each leaf stalk. Fruit produced in large clusters; berries nearly round, deep scarlet, and of good flavour. A heavy bearer and good grower, with few spines on the wood.

9. Perpetuelle de Billard.—Five broad leaflets on each leaf stalk. Fruit produced in large clusters; berries round, very dark crimson, of great size and good flavour. A heavy cropper and good grower, often bearing a crop of fruit in the autumn in addition to the July crop.

10. Norwich Wonder.—Five very large leaflets on each leaf stalk. Fruit produced in moderate clusters; berries large, deep red, bluntly pointed, and of very good flavour. An excellent bearer and robust grower, with few spines on the wood.

11. Semper Fidelis.—Five small leaflets on each leaf stalk. Fruit produced in very large clusters; berries bluntly pointed, medium in size, deep scarlet, acid in flavour. A heavy bearer, making strong wood covered with sharp spines.

12. Superlative. **F.C.C.** 1888.—Five large leaflets on each leaf stalk. Fruit produced in great clusters; berries bluntly pointed, very large, deep crimson, and very good flavour. A splendid bearer and strong, vigorous grower, with scarcely any spines on the wood.

13. White Antwerp.—Five moderate leaflets on each leaf stalk. Fruit produced in small clusters; berries round, yellow, and of rather sweet flavour. A light bearer and moderate in growth, bristling with sharp spines.

14. White Magnum Bonum.—A sweeter and improved form of No. 13.

REPORT ON BLACK CURRANTS, CHISWICK, 1898.

Owing to the large bushes of Black Currants being very severely infested with the Black Currant mite (*Phytoptus ribis*), and it being almost hopeless to eradicate the pest by hand picking, owing to the great quantity of buds infested, every tree of every

variety being alike attacked, the whole of the collection was dug up in 1896, and the ground trenched two feet deep and well manured. A young piece with roots attached was broken from the old bushes, and planted on the same ground formerly occupied by the Black Currants. All infested buds were carefully picked off immediately they were observed to be swelling to an abnormal size. The following spring, 1897, the little bushes were gone over again early, and all infested buds again removed and burnt, as had been done the previous year. The result of planting again in the deeply worked soil and persistently removing infested buds has been that only a few buds appeared containing the mite in the early part of 1898. The bushes have made splendid growth, and produced an excellent crop of fruit this year. The following are some of the varieties treated as above:—

1. Baldwin's Black.—Leaves as broad as they are long ; lobes pointed and sharply serrated ; berries large, sweet, and produced in long clusters. A good, sturdy grower and heavy cropper.

2. Black Naples.—Leaves longer than they are broad ; lobes sharply pointed and much serrated ; berries of medium size, a little acid in flavour. Clusters of fair size. A moderate grower and free cropper.

3. Carter's Champion.—Leaves longer than they are broad ; lobes very pointed ; berries very large, of good flavour, and borne in long clusters. A strong grower and great cropper. A variety called Black Champion, shown by Mr. Dunnett, received F.C.C. in 1881, and is believed to be identical with this.

4. Downley Hall Prolific.—Same as No. 8.

5. James' Prolific.—Leaves longer than they are broad ; lobes very pointed and moderately serrated ; berries of medium size and fair flavour. Clusters rather short. A good grower but light cropper when compared with other varieties.

6. Lee's Prolific (F.C.C. 1869).—Leaves as broad as they are long ; lobes very pointed, sharply serrated ; berries above medium size, very sweet, and produced in good clusters. A great bearer and moderate grower.

7. Golden-leaved.—This is of no value for cropping, but it makes a striking and beautiful bush in the early summer ; later on the rich golden foliage changes to almost green.

8. Old Black.—Leaves as broad as they are long ; lobes pointed

and sharply serrated; berries rather small, sweet, and produced in good clusters. A vigorous grower and free bearer.

9. *Victoria*.—Very similar in fruit, size, flavour, and cropping to No. 3, but differing in the foliage, which is broader than it is long.

REPORT ON PEAS AT CHISWICK, 1898.

Thirty-eight stocks of Peas were received for trial in the gardens, and twenty-five older varieties were grown with them for comparison. The whole collection was sown on March 15 on ground that had been ridge-trenched in the early part of the winter and liberally manured. Owing to the drought the plants did not make such vigorous growth as usual; but the crop was good in most instances, and the plants entirely free from mildew. Two meetings were held by the Committee to examine them—on July 5, for the early varieties, and on July 22, for the later ones.

F.C.C.—First Class Certificate.

A.M.—Award of Merit.

1. *Acme* (J. Veitch).—**A.M.** July 5, 1898. Haulm and pods deep green; pods in pairs, averaging seven large and sweet Peas in straight pods; heavy crop. Ready for use July 3. Height 3 feet. Seeds wrinkled.

2. *Continuity* (Suttons).—**A.M.** July 22, 1898. Haulm and pods dark green; pods in pairs, averaging eight large Peas in each; flavour excellent; pods straight and broad; heavy crop. Ready for use July 19. Height 3 feet. Seeds wrinkled.

3. *Conquest* (Hurst & Sons).—Haulm and pods pale green; pods in pairs, averaging eight large green Peas in blunt, straight pods; moderate crop; height 4 feet. Ready for use July 15. Seeds wrinkled.

4. *Dark Green Marrowfat* (Johnson).—Haulm and pods deep green; pods in pairs, averaging seven large Peas in straight pods; flavour excellent; very heavy crop. Ready for use July 16. Seeds wrinkled. The Committee wished to see this variety again next year after a little more selection.

5. *Drummond's New Pea* (Drummond).—**A.M.** July 5, 1898. Haulm and pods dark green; pods in pairs, averaging seven large

bright green sweet Peas in straight pods; good crop. Ready for use July 5. Height $4\frac{1}{2}$ feet. Seeds wrinkled.

6. Duke of York (Toogood).—**A.M.** June 6, 1893. An improved form of Duke of Albany. Ready for use July 5. A very good variety.

7. Dwarf Marrow (Toogood).—Haulm and pods very dark green; pods in pairs, averaging seven large Peas in straight pods; moderate crop; height $1\frac{1}{2}$ feet. Ready for use July 5. Seeds wrinkled.

8. Early Market (Watkins & Simpson).—Haulm and pods dark green; pods single, averaging seven large grass-green Peas in slightly curved pods; flavour fairly good; moderate crop. Ready for use July 5. Height 3 feet. Seeds wrinkled.

9. Early Nonesuch (Hurst & Sons).—Haulm and pods deep green; pods in pairs, averaging eight large and very sweet Peas in each, in long straight pods; moderate crop; height 1 foot. Ready for use July 5. Seeds wrinkled.

10. Early Perfection (Toogood).—Haulm and pods pale green; pods in pairs, averaging six large sweet deep green Peas in straight pods; good crop; height $3\frac{1}{2}$ feet. Ready for use July 4. Seeds wrinkled.

11. Excelsior (Suttons).—Haulm and pods dark green; pods in pairs, averaging six large sweet Peas in straight pods; moderate crop; height 15 inches. Ready for use July 5.

12. Express (Fidler).—Haulm and pods a pea-green; pods single, averaging eight sweet Peas of beautiful colour in each straight pod; rather a light crop; height 4 feet. Ready for use July 5. Seeds wrinkled.

13. Gilmore's Wrinkled (Dean).—A poor selection of Ne Plus Ultra.

14. Goldfinder (R. Veitch).—An excellent early form of Ne Plus Ultra.

14a. Gradus (R. Veitch).—**F.C.C.** July 1, 1887. Haulm and pods deep green; pods very large, mostly single, averaging eight fine deep green Peas of excellent flavour in straight pods; good crop; height 3 feet. Ready for use July 5. Seeds wrinkled. A fine stock of this old favourite, and still one of the best.

15. Hales' Seedling (Hales).—Haulm and pods deep green; pods single, averaging six large pale green Peas in straight pods; good crop; height $1\frac{1}{2}$ feet. Ready for use July 4. Seeds wrinkled.

16. Harbinger (Suttons).—Haulm and pods dark green; pods single, short, and thick, averaging five large pale green sweet Peas in each; fair crop; height eight inches. Ready for use July 3. Seeds wrinkled. An excellent variety for pots or frames.

17. Hertford Success (Nutting).—**A.M.** July 22, 1898. Haulm and pods very dark green; pods in pairs, averaging nine large sweet Peas in each slightly curved pod; heavy crop; height $3\frac{1}{2}$ feet. Ready for use July 21. Seeds wrinkled. This variety is very similar to Fillbasket.

18. Her Majesty (Toogood).—Same as Ne Plus Ultra.

19. Honeydew (Sim).—**A.M.** July 22, 1898. Haulm and pods very dark green; pods in pairs, averaging seven large pale green Peas of good flavour in straight pods; moderate crop; height 3 feet. Ready for use July 17. Seeds wrinkled.

20. Incomparable (Hurst & Sons).—Haulm and pods light green; pods single, averaging eight large pale green Peas in straight pods; good crop; height 3 feet. Ready for use July 5. Seeds wrinkled.

21. Mansfield Show (Wright Bros.).—**A.M.** July 22, 1898. Haulm and pods very dark green; pods in pairs, averaging nine very large and sweet Peas in straight, broad pods; very heavy crop; height $3\frac{1}{2}$ feet. Ready for use July 21. Seeds wrinkled.

22. New Wrinkled Daybreak (Goody).—Haulm and pods light green; pods single, averaging five large Peas in straight pods; fair crop; height 3 feet. Ready for use July 5. Seeds wrinkled.

23. Peerless Marrowfat (Suttons).—Haulm and pods very dark green; pods single, averaging six large sweet Peas in straight pods; good crop; height 2 feet. Ready for use July 15. Seeds wrinkled.

24. Prior (Eckford).—**A.M.** July 22, 1898. Haulm and pods bright green; pods in pairs, averaging nine large sweet Peas in straight, pointed pods; good crop; height $4\frac{1}{2}$ feet. Ready for use July 19. Seeds wrinkled.

25. Profuse (Nutting).—Haulm and pods dark green, averaging six large Peas in slightly curved pods; heavy crop; height 3 feet. Ready for use July 15. Seeds wrinkled.

26. Prolific Marrow (Suttons).—Haulm and pods deep green; pods in pairs, averaging seven large sweet Peas in straight pods;

good crop; height $2\frac{1}{2}$ feet. Ready for use July 19. Seeds wrinkled.

27. Queen (Fidler).—Haulm and pods deep green; pods single, averaging five large Peas in each; moderate crop; height 2 feet. Ready for use July 16. Seeds wrinkled.

28. Rentpayer (Watkins & Simpson).—Haulm and pods dark green; pods single, averaging seven large sweet Peas in long, broad, straight pods; moderate crop; height 16 inches. Ready for use July 15. Seeds wrinkled.

29. Saccharine (Sim).—**A.M.** July 22, 1898. Haulm and pods deep green; pods in pairs, averaging eight large and very sweet Peas in long, straight pods; good crop; height 5 feet. Ready for use July 19. Seeds wrinkled.

30. Southampton Marrow (Toogood).—Haulm and pods pale green; pods in pairs, averaging eight large Peas of good flavour in straight pods; heavy crop; height 3 feet. Ready for use July 15. Seeds wrinkled.

31. Sutton's Seedling (Suttons).—Haulm and pods dark green; pods in pairs, averaging five large sweet Peas in straight pods; good crop; height 1 foot. Ready for use July 5. Seeds wrinkled.

32. Stowe's Seedling (Stowe).—Haulm and pods a peculiar shining green, distinct from all others; pods in pairs, averaging six large Peas of inferior flavour in each straight pod; moderate crop; height 2 feet. Ready for use July 19. Seeds wrinkled.

33. The Bruce (Eckford).—**A.M.** July 22, 1898. Haulm and pods a rather light green; pods in pairs, averaging nine large Peas of good flavour in straight pods; heavy crop; height 5 feet. Ready for use July 15. Seeds wrinkled.

34. Thomas Laxton (Laxton).—**A.M.** July 5, 1898. Haulm and pods pea-green; pods usually single, averaging seven large Peas of fine flavour in straight pods; good crop; height $3\frac{1}{2}$ feet. Ready for use July 5. Seeds wrinkled.

35. To-morrow (Toogood).—Haulm and pods light green; pods single, averaging eight large Peas in slightly curved pods; good crop; height 3 feet. Ready for use July 5. Seeds wrinkled.

36. Tremendous (Toogood).—Haulm and pods deep green; pods single, averaging eight large sweet Peas in broad, straight pods; moderate crop; height 3 feet. Ready for use July 5. Seeds wrinkled.

37. Ward's Incomparable (Ward).—Same as Ne Plus Ultra.

38. Yorkshireman (Dixon).—Haulm and pods dark green; pods in pairs, averaging eight large sweet Peas in straight pods; heavy crop; height $2\frac{1}{2}$ feet. Ready for use July 16. Seeds wrinkled.

REPORT ON PEACHES AND NECTARINES AS GROWN AT CHISWICK, 1897-98.

Owing to the confusion existing amongst the varieties of Peaches and Nectarines, the Council appointed a Nomenclature Committee, consisting of Messrs. Bunyard, Rivers, Pearson, Morle, Hudson, Smith, and the Rev. W. Wilks. These gentlemen examined the varieties on several occasions when the fruit was ripe, and after very carefully examining the whole collection arrived at the following conclusions:—

PEACHES.

À Bec.—This variety was decided to be not true, the leaves having kidney-shaped glands and slightly serrated edges; the fruit also was not in proper character, not having the red tinge in its flesh near the stone. The variety is thus described by Dr. Hogg in the *Fruit Manual*:—"Fruit large, roundish, uneven in its outline, terminating at its apex in a bold, blunt nipple, and marked with a shallow suture, which is higher on one side. Skin remarkably thin and tender, of a lemon yellow colour, with crimson dots on the shaded side, but covered with a crimson cheek and darker spots of the same colour on the side exposed to the sun. Flesh white, with a very slight red tinge next the stone, from which it separates freely; remarkably tender and melting, sweet, and with somewhat of a Strawberry flavour. Flowers large. Leaves with round glands. It ripens the third week in August."

Acton Scot.—Several trees were under this name, none of which were true to name. No. 1 had leaves without glands and small flowers, proving to be 'Royal George.' Nos. 2 and 3 had leaves with very slightly serrated edges, kidney-shaped glands, and large flowers. The true variety should have leaves with round glands. Fruit small and highly coloured on the exposed side. Ripe about the middle of August. Flowers large.

Albatross.—True. Flowers large; leaves moderately serrated, glandless; fruit very large; skin bright yellow on shaded side, crimson on the exposed side; round and of good shape; flesh white, tinged with red near the stone; of good flavour but somewhat stringy near the stone. Freestone.

Alexander (*syn.* Early Alexander).—True. Flowers large; leaves moderately serrated, with round glands; fruit above medium size, round, with a small nipple in a slight depression at the apex; skin yellow on the shaded side, bright crimson on the exposed side; flesh creamy-white all through, which adheres rather firmly to the stone; flavour second rate, but very juicy. This is one of the earliest Peaches in cultivation, but has the serious defect of casting its buds largely under glass, and is chiefly valuable for its size, colour, and great earliness.

Alexandra Noblesse.—True. Flowers large; leaves slightly serrated, with round glands; fruit large, round, with a small nipple at the apex; skin a pale cream colour, occasionally suffused with pink on the exposed side; flesh white, melting, of delicious flavour, and parting freely from the stone. Ripe in the middle of August. This is an excellent variety for mid-season supplies, and perhaps the finest flavoured of all Peaches, but usually does not force well.

Barrington.—True. Flowers large; leaves moderately serrated, with round glands; fruit large, deep, round, with a large nipple at the apex; skin greenish in the shade, red and marbled with crimson on the exposed side; flesh whitish, tinged with red near the stone, and of first-class flavour. One of the finest and best late Peaches, equally satisfactory under glass or outside.

Belle de Doué.—True. Flowers small; leaves moderately serrated; glands round; fruit medium size, deep round; skin pale on the shaded side, deep red or crimson on the exposed side; flesh whitish, melting, and delicious flavour. An excellent mid-season variety.

Bellegarde.—True. Flowers small; leaves serrated rather deeply, with round glands; fruit large, round, with a small nipple in a slight depression at the apex; skin deep red, marked with broad stripes of blackish crimson; flesh creamy-white, tinged with red next the stone, from which it parts readily. The flavour is very rich and refreshing and highly esteemed.

This variety is a most reliable and hardy Peach, first rate for inside or outside culture. Ripe early in September.

Crawford's Early.—True. Flowers small; leaves very slightly serrated, with round glands; fruit very large, deeper than it is broad; skin a deep yellow changing to dark orange on the exposed side; flesh yellow, with a red tinge near the stone, from which it parts freely. The flavour is not very good at Chiswick, the flesh being somewhat dry and stringy; nor is it an early variety, as its name would indicate, the fruit not being ripe until the early part of September.

Cricket.—True. Flowers small; leaves serrated deeply, with kidney glands; fruit medium size, pale green on the shaded side, deep crimson on the exposed side; flesh white and of fair quality, parting readily from the stone. A mid-season variety, of comparatively little value at Chiswick.

Crimson Galande.—True. Flowers small; leaves serrated, with round glands; fruit medium to large, round, with a small depression at the apex; skin crimson on the shaded side and deeper in colour on the exposed side; flesh deeply tinged with red, especially near the stone, from which it parts readily. The flavour is exquisite and the tree one of the freest bearers. Ripe about the middle of August.

Condor.—True. Flowers small; leaves deeply serrated, with kidney glands; fruit medium to large, roundish, with a very small nipple; skin pale on the shaded side, deep crimson on the exposed side; flesh whitish, melting, juicy, and first-class flavour. An excellent mid-season variety.

Dagmar.—True. Flowers small; leaves moderately serrated, occasionally having both round and kidney-shaped glands, the latter usually predominating on the leaves; fruit deeper than broad, with a prominent nipple at the apex; skin downy and nearly covered with deep crimson; flesh white, very melting, and fine flavour. Ripe early in August.

Desse Tardive.—True. Flowers small; leaves serrated, with round glands; fruit large, free from any nipple; skin pale on the shaded side, heavily marked on the exposed side with crimson; flesh white, tinged with red near the stone. This variety is one of the best flavoured Peaches at Chiswick, being very juicy and melting, with a peculiarly rich taste. Ripe early in September.

Doctor Hogg.—True. Flowers large; leaves slightly serrated, with kidney glands; fruit medium to large, very round; skin pale on the shaded side, with a pretty crimson flush on the exposed side; flesh white near the skin, changing to red near the stone, from which it parts readily; flavour rich and pleasing. Ripe early in August.

Dymond.—This was decided to be Grosse Mignonne. The true Dymond should have glandless leaves, and is a most reliable and excellent late variety.

Early Admirable.—This differed from the true variety in having leaves with kidney glands instead of round glands; the fruit was also not correct in colour or flesh. Dr. Hogg thus describes the fruit in the *Fruit Manual*:—"Skin fine, clear, light yellow in the shade, bright red next the sun; suture distinct; flesh white, pale red at the stone, rich, sweet, and sugary. Ripens in the beginning of September."

Early Ascot.—True. Flowers small; leaves with round glands; fruit rather below medium size, round; skin red on the shaded side, blackish crimson on the exposed side; flesh whitish yellow, tinged with red near the stone, from which it parts readily; flavour fairly good. Ripe early in August.

Early Albert.—True. Flowers small; leaves slightly serrated, with round glands; fruit medium size, round, with a depression at the apex; skin pale on the shaded side, blackish crimson on the exposed side; flesh white, tinged with red near the stone, from which it parts freely; flavour good and very refreshing. Ripe early in August.

Early Alfred.—The flowers were large, and the leaves with kidney glands, whereas in the true variety the flowers are small, with leaves having round glands.

Early Beatrice.—True. Flowers large; leaves sharply serrated with kidney glands; fruit small, round, some having a nipple at the apex; skin creamy white on the shaded side, dark red or crimson on the exposed side; flesh white, somewhat stringy, adhering a little to the stone; flavour poor and not worth growing at Chiswick.

Early Grosse Mignonne.—True. Flowers large; leaves with round glands; fruit, medium to large, round, with a small nipple in a slight depression at apex; skin pale on the shaded side, deep red on the exposed side, often spotted with crimson; flesh

white and tinged with red all through, parting readily from the stone; flavour very good and melting. Ripe early in August.

Early Louise.—True. Flowers small; leaves with kidney glands; fruit small to medium; skin pale on the shaded side, dark red on the exposed side; flesh creamy white, clinging firmly to the stone; flavour second rate. Ripe at the end of July or early in August.

Early Purple.—True. This variety had been grown under the name of French Mignonne, but the Committee decided that the name now given was correct. Flowers large; leaves with kidney glands; fruit a flattish round; skin a pale green dotted with crimson, on the unshaded side deep purplish crimson; flesh white, heavily splashed with red, deepening near the stone, to which it clings a little; flavour delicious. Ripe at the end of August.

Early Rivers.—True. Flowers large; leaves bluntly serrated, with kidney glands; fruit large, round, pale yellow on the shaded side, beautiful soft red on the exposed side; flesh white, parting freely from the stone; flavour excellent. Ripe early in August. This is a lovely Peach, but has the serious defect at Chiswick of having about 90 per cent. of its fruit with split stones, causing the fruit to be of no value.

Early Silver.—True. Flowers large; leaves slightly serrated, with kidney glands; fruit medium to large, roundish, ovate, usually having a prominent nipple at the apex; skin, a pale cream colour with a delicate red flush on the exposed side; flesh white, parting freely from the stone; flavour moderately good. A somewhat shy bearing and unsatisfactory Peach at Chiswick. Ripe at the end of August.

Early Victoria.—True. Flowers large; leaves glandless; fruit medium, round; skin pale green on the shaded side, dull red on the exposed side. Flesh white and of only fair quality. Ripe middle of August.

Early York.—True. Flowers large; leaves with round glands; fruit roundish, ovate, medium to large, frequently with a nipple at the apex; skin pale green on the shaded side, dark red or crimson on the exposed side; flesh whitish, melting, and parting freely from the stone; flavour first rate. Ripe early in August.

Exquisite.—True. Flowers small; leaves moderately serrated, with round glands; fruit large, roundish, ovate, with a

prominent nipple at the apex; skin a deep apricot yellow on the shaded side, dark red or crimson on the exposed side; flesh yellow, heavily tinged with deep red near the stone, from which it parts freely; flavour moderately rich. A free bearing late Peach.

Frogmore Golden.—True. Flowers small; leaves slightly serrated, with round glands; fruit large, roundish, deep golden yellow on the shaded side, flushed with red on the exposed side; flesh yellow, parting readily from the stone; flavour fairly good. Ripe early in August. The tree is a strong and somewhat diffuse grower.

Gladstone.—True. Flowers large; leaves deeply serrated, glandless; fruit large, round, occasionally with a nipple at the apex; flesh white, parting freely from the stone; flavour only second rate at Chiswick and rather stringy in texture. A rampant grower. A very late variety.

Goshawk.—True. Flowers large; leaves glandless; fruit medium to large, roundish ovate, usually with a nipple at the apex; skin pale green on the shaded side, deep red or crimson on the exposed side; flesh greenish white and of fairly good flavour. Ripe about the middle of August. This variety is uncertain; in some gardens the fruit sets freely and is of fine quality, in others it sets badly and is of indifferent flavour.

Golden Eagle.—True. Flowers small; leaves with kidney glands; fruit large, flat, round; skin deep yellow, flushed with red on the exposed side; flesh pale yellow, tinged with red near the stone, from which it parts readily; flavour fairly good, and the best of the late yellow Peaches. Ripe at the end of September.

Gregory's Late.—True. Flowers small; leaves deeply serrated, with round glands; fruit large, roundish, ovate; skin pale green on the shaded side, deep red on the exposed side; flesh greenish white, parting readily from the stone; flavour second rate. A very late variety, requiring a late warm season to ripen the fruit properly.

Grosse Mignonne.—True. Flowers large; leaves very slightly serrated, with round glands; fruit large, flattish, round; skin downy, pale yellow dotted with red on the shaded side, purplish red on the exposed side; flesh creamy white, occasionally heavily splashed with red, especially near the stone, from which

it parts freely; flavour first class. Ripe from the middle to the end of August.

Grosse Violette Hâtive.—True. Flowers small; leaves moderately serrated, with both kidney and round glands; fruit medium, roundish; skin pale green on the shaded side, dark red on the exposed side; flesh creamy white, parting freely from the stone; flavour very good. Ripe at the end of August.

Hales' Early.—True. Flowers large; leaves serrated, with round glands; fruit medium to large, round, sometimes having a nipple at the apex and sometimes flat; skin pale green, faintly streaked with red on the shaded side, dark red or crimson on the exposed side; flesh creamy white, parting readily from the stone; flavour first class. Ripe early in August.

Late Admirable.—True. Flowers small; leaves moderately serrated, with round glands; fruit large, pointed, having a prominent nipple at the apex; skin pale green on the shaded side, dark red on the exposed side; flesh greenish-white, tinged with red near the stone, from which it parts freely; flavour only moderately good at Chiswick. Ripe about the middle of September.

Lord Palmerston.—True. Flowers large; leaves serrated, having round, kidney, and no glands; skin pale green on the shaded side, deeply flushed with red on the exposed side; flesh white, tinged with red near the stone, to which it clings somewhat; flavour very poor. Ripe at the end of September. This variety has nothing to recommend it except its immense size and fine appearance.

Magdala.—True. Flowers large; leaves rather deeply serrated, with kidney glands; skin very pale green, slightly marbled with red on the shaded side, very dark red or crimson on the exposed side; flesh pale green, parting readily from the stone; a medium-sized Peach of delicious flavour. Ripe at the end of August.

Malta.—True. Flowers large; leaves sharply serrated, glandless; fruit medium, flat, round; skin pale green on the shaded side, dark crimson on the exposed side; flesh greenish white, heavily tinged with red near the stone, from which it parts freely; flavour fairly good and best in hot seasons. Ripe at the end of August.

Nectarine Peach.—True. Flowers large; leaves serrated, with

kidney glands ; fruit large, roundish, with a very prominent nipple at the apex ; skin a cream colour on the shaded side, flushed with red on the exposed side ; flesh white, deep red near the stone, from which it parts readily ; flavour first class, especially from the trees under glass. Ripe early in September.

Noblesse.—True. Flowers large ; leaves serrated, glandless ; fruit large, roundish, with a nipple at the apex ; skin a soft yellowish white on the shaded side, flushed with a purplish red on the exposed side ; flesh white, tinged with red near the stone, from which it parts readily ; flavour first class. Ripe early in September.

Prince of Wales.—True. Flowers small ; leaves moderately serrated, with kidney glands ; fruit large, flattish, round ; skin downy, green on the shaded side, dark crimson on the exposed side ; flesh white, dark red near the stone, from which it parts freely ; flavour very good. Ripe from the middle to the end of September.

Princess of Wales.—True. Flowers large ; leaves serrated, with round glands ; fruit large, flattish, round, with a nipple at the apex ; skin creamy white, flushed with a soft pink on the exposed side ; flesh white, tinged with deep red near the stone, from which it parts readily ; flavour very good. Ripe at the end of September.

Red Magdalen.—True. Flowers large ; leaves sharply serrated, glandless ; fruit rather small, round ; skin creamy white on the shaded side, red on the exposed side ; flesh white tinged with red near the stone, from which it parts freely ; flavour very good. Ripe at the end of August.

Rivers' Early York.—True. Flowers large ; leaves with round glands. This is very similar to Early York in all points, but possesses a better constitution, and sets its fruit more freely than the Early York does. Ripe early in August.

Royal George.—True. Flowers small ; leaves sharply serrated, glandless ; fruit large, round ; skin pale green on the shaded side, deep red or crimson on the exposed side ; flesh greenish white, heavily marked with red near the stone, from which it parts readily ; flavour first class. Ripe about the middle of August. Several other trees at Chiswick under this name were incorrect, having both round and kidney glands on the

leaves. The above description agrees with a "Report on Peaches" grown at Chiswick on July 27, 1826.

Salwey.—When true this variety should have small flowers, and leaves with kidney glands; fruit and flesh a deep orange colour, and only third rate in flavour. The variety examined was thought by some of the Committee to be Yellow Admirable, which has leaves with round glands.

Sea Eagle.—True. Flowers large; leaves serrated, with round glands; fruit large, round; skin pale yellow on the shaded side, deep red on the exposed side; flesh a yellowish white, heavily tinged with red near the stone; flavour second rate. Ripe early in October.

Stirling Castle.—True. Flowers small; leaves serrated, with round glands; fruit medium to large, round; skin pale green on the shaded side, dark red on the exposed side; flesh greenish white; flavour very good. Ripe at the end of August.

Stump the World.—True. Flowers small; leaves serrated, with round glands; fruit medium to large, round, flat at the apex; skin a pale green on the shaded side, very dark red on the exposed side; flesh greenish white, parting freely from the stone; flavour excellent. Ripe from the middle to the end of August.

Tetonde Venus.—True. Flowers small; leaves sharply serrated, with round glands; fruit medium to large, with a very thick prominent nipple at the apex; skin pale green or nearly white on the shaded side, flushed with bright red on the exposed side; flesh whitish, tinged with red near the stone; flavour delicious and first class at Chiswick, from an old tree. Ripe about the middle of September.

Thames Bank.—This differed in all points from the true variety, and was not recognised by the Committee, the true Thames Bank being very similar to Exquisite.

Violette Hâtive.—True. Flowers small; leaves serrated, with round glands; fruit medium to large, roundish, often with a nipple at the apex; skin very pale green on the shaded side, dark red on the exposed side; flesh greenish white, parting freely from the stone; flavour very good. Ripe early in September.

Vanguard.—Variety not recognised. Dr. Hogg in the *Fruit Manual* describes Vanguard as being very similar to

Noblesse, the only difference being in the habit of the trees, Vanguard being more vigorous than Noblesse.

Walburton Admirable.—True. Flowers small; leaves slightly serrated, with round glands; skin pale green on the shaded side, very dark red or crimson on the exposed side; flesh creamy white, parting from the stone; flavour very good in late warm seasons. Ripe early in October.

Waterloo.—True. Flowers large; leaves slightly serrated, with kidney glands; fruit medium to large, round, with a small nipple at the apex; skin pale green on the shaded side, bright red, almost crimson, on the exposed side; flesh greenish white, clinging somewhat tightly to the stone; flavour only moderately good. Ripe early in July. The chief value of this variety is its earliness. When forced early is liable to cast its buds.

NECTARINES.

Advance.—True. Flowers large; leaves rather deeply serrated, glandless; fruit large, flattish, round; skin green on the shaded side, speckled with red on the exposed side; flesh pale green, parting readily from the stone; flavour first class. Ripe early in August.

Albert Victor.—True. Flowers small; leaves slightly serrated, with round glands; fruit medium to large, flattish, round; skin pale green on the shaded side, deep dull red on the exposed side; flesh pale green, heavily tinged with red near the stone, to which it clings a little; flavour very good. Ripe the middle of September. A most unsatisfactory Nectarine at Chiswick, most of the fruit splitting or dropping before it is ripe.

Balgowan.—True. Flowers small; leaves serrated, with kidney glands; fruit medium to large, roundish; skin pale green on the shaded side, deep bright red or crimson on the exposed side; flesh pale green, tinged with red near the stone, from which it parts readily; flavour first class. Ripe at the end of August.

Byron.—True. Flowers extra large; leaves slightly serrated, with kidney glands; fruit medium to large, roundish, with a small nipple at the apex; skin yellow on the shaded side, but nearly covered with a rich deep crimson; flesh deep yellow, faintly tinged with red near the stone, from which it parts readily; flavour first class. Ripe early in September. This is

one of the finest and most prolific Nectarines; for which we have to thank Mr. Rivers.

Dante.—True. Flowers small; leaves slightly serrated, with kidney glands; fruit medium, roundish; skin green, flushed with red on the exposed side. A late Nectarine of no value at Chiswick, very few of the fruits ripening properly.

Downton.—True. Flowers small; leaves serrated, with kidney glands; fruit medium to large, roundish; skin pale green on the shaded side, deep red on the exposed side; flesh pale green, tinged with red near the stone, from which it parts freely. Ripe at the end of August. Rivers' Improved Downton is a larger and superior form, remarkably prolific, and of first-class flavour.

Dryden.—True. Flowers small; leaves slightly serrated, with kidney glands; skin nearly covered with deep crimson; flesh whitish, parting freely from the stone; flavour first class. Ripe at the end of August. This is one of the very best Nectarines in all respects in the Chiswick collection. The tree is a good grower, producing its large handsome fruit in great abundance. It was raised by Mr. Rivers.

Duc de Telliers.—True; flowers small; leaves serrated, with kidney glands; fruit medium, roundish; skin pale green on the shaded side, deep blood-red on the exposed side; flesh pale green tinged with red near the stone; flavour decidedly poor on the old tree at Chiswick. Ripe early in September. Dr. Hogg describes this variety under the name of 'Dutilly's' in the *Fruit Manual*.

Early Murrey.—This variety was not recognised by the Committee; flowers small; leaves slightly serrated, with round glands; fruit medium, round, nearly covered with purplish red; flavour moderately good. Ripe at the end of August.

Elruge.—True. Flowers small; leaves serrated, with kidney glands; skin pale green on the shaded side, deep blood-red on the exposed side; flesh greenish white, parting readily from the stone; flavour very good. Ripe about the middle of August. A large and prolific variety.

Goldoni.—True. Flowers small; leaves slightly serrated, with kidney glands; fruit medium to large; skin orange yellow on the shaded side, flushed with crimson on the exposed side; flesh deep yellow, adhering to the stone; flavour very good. Ripe at the end of August.

Hardwicke.—True. Flowers large; leaves deeply serrated, glandless; fruit large, deep, round; skin green on the shaded side, deep dull red on the exposed side; flesh pale green, tinged with red near the stone; flavour first class, especially when grown under glass. Ripe at the end of August.

Humboldt.—True. Flowers large; leaves slightly serrated, with round glands; fruit medium to large, round, with a small nipple at the apex; skin yellow on the shaded side, dark crimson on the exposed side; flesh yellow, tinged with red near the stone, from which it parts freely; flavour first class. Ripe at the end of August.

Lord Napier.—True. Flowers large; leaves slightly serrated, with kidney glands; fruit large, deep, round, slightly depressed at the apex, and with a prominent nipple; skin very pale on the shaded side, bright dark crimson on the exposed side. Flesh whitish, parting readily from the stone; flavour very good. Ripe early in August. One of our finest Nectarines.

Mercury.—True. Flowers small; leaves serrated, with kidney glands; fruit medium, deep, round; skin green on the shaded side, deep red or crimson on the exposed side; flesh very pale green, parting very readily from the stone; flavour fairly good. Ripe early in September.

Newton.—True. Flowers small; leaves slightly serrated, with kidney glands; fruit large, flattish, round; skin pale green on the shaded side, marbled with red on the exposed side; flesh pale green, tinged with red all through, parting readily from the stone; flavour very crisp and first class. Ripe early in September. A moderate bearer at Chiswick.

New Pale Newington.—Not recognised, and of no value.

Oldenburgh.—True. Flowers small, with very few petals; leaves slightly serrated, with kidney glands; fruit a little below medium size, round; skin pale yellow on the shaded side, rich dark red on the exposed side; flesh creamy white, separating freely from the stone; flavour first class. Ripe at the end of August. In the *Fruit Manual* it is stated to be synonymous with Elruge, but they are quite distinct.

Pine Apple.—True. Flowers large; leaves serrated, with round glands; fruit large, deep, round, often with a small nipple at the apex; skin bronzy yellow on the shaded side, deep red or dull crimson on the exposed side, dotted with brown spots; flesh

yellow, tinged with red near the stone, from which it parts readily; flavour first class—one of the best. Ripe early in September.

Pitmaston Orange.—True. Flowers large; leaves with round glands; fruit very similar to but smaller than Pine Apple, ripening at the same time. Both varieties are excellent bearers, and possess good constitutions.

Prince of Wales.—True. Flowers small; leaves slightly serrated, with some leaves having kidney and others round glands; fruit large, round; skin green on the shaded side, dark crimson on the exposed side; flesh pale green, heavily tinged with red near the stone, from which it parts readily; flavour very good. Ripe at the end of September.

Red Roman.—True. Flowers large; leaves serrated, with kidney glands; fruit medium, round, skin pale green on the shaded side, blackish crimson on the exposed side; flesh greenish white, heavily tinged with red near the stone, to which it clings somewhat firmly; flavour fairly good. Ripe about the middle of September.

Rivers' Early.—True. Flowers large; leaves serrated, with kidney glands; fruit large, deep, round; skin very pale green on the shaded side, bright dark red on the exposed side; flesh whitish, clinging a little to the stone; flavour very good. Ripe from the beginning to middle of July on a warm wall. A valuable and reliable early variety.

Rivers' Orange.—True. Flowers large; leaves serrated, with kidney glands; fruit medium, round; skin bright orange on the shaded side, rich dark crimson on the exposed side; flesh deep yellow, strongly marked with red near the stone, from which it parts freely; flavour first class. Ripe at the end of August.

Stanwick Elruge.—True. Flowers large; leaves serrated, with round glands; fruit large, deep, round; skin green on the shaded side, bright purplish crimson on the exposed side; flesh pale green, parting from the stone; flavour first class. Ripe about the middle of August. A very fine and free bearing variety.

Victoria.—The variety under this name was worthless, and not at all resembling the true variety in its fruit. Not recognised.

White.—True. Flowers large; leaves serrated, with kidney

glands; fruit large, round; skin very white, flushed with red on the exposed side; flesh white, parting readily from the stone; flavour only second rate. Ripe at the end of August. A pretty fruit, but a shy bearer.

REPORT ON POTATOS AT CHISWICK, 1898.

Forty-eight varieties of Potatos were sent for trial, and seventeen older well-known varieties were also grown for comparison. The ground had been specially prepared for the crop by the addition of leaf mould and old potting soil, the result being that the growth was excellent, the crops heavy in most instances, and, with a very few exceptions, no disease. The collection was examined by the Fruit and Vegetable Committee on two occasions, viz. July 22 and August 30. The following varieties, by reason of their heavy crops and good appearance, were selected for cooking to test their quality, viz.—

A 1.	McKinley.
Challenge.	Miss Ellen Terry.
Devonian.	New Main Crop.
Fishtoft Seedling.	Palmyra.
Ideal.	Queen.
Ivo.	Sir Walter Raleigh.
Leader.	The Major.

F.C.C.—First Class Certificate.

A.M.—Award of Merit.

1. A 1 (Sutton).—Medium size, round, eyes shallow, white. Moderate crop, free from disease; short haulm. Early.

2. Bailey's White Russet (Richards).—Large, round, eyes shallow, white, russety. A great crop, free from disease; tall strong haulm. Late. A variety under the name of White Russett (Harris) received an **A.M.** September 20, 1892.

3. Bloomer (Collins).—Medium size, kidney, eyes full, pale purple. Light crop, free from disease; short haulm. Early.

4. Candidum (Storrie).—Large, kidney, eyes shallow, white. Heavy crop, free from disease; moderate haulm. Midseason.

5. Challenge (Sydenham).—**A.M.** September 6, 1898. Large, round, eyes shallow, white and very russety skin, handsome. An enormous crop, free from disease; first rate when cooked; moderate haulm. Late.

6. Devonian (Thomas).—**A.M.** September 6, 1898. Medium, kidney, eyes full, handsome, white. Very heavy crop, free from disease; fine quality when cooked; moderate haulm. Late.

7. Early Favourite (Palmer).—Medium, kidney, eyes full, white. Heavy crop, free from disease; short haulm. Early.

8. Early Market (Johnson).—Medium, kidney, eyes full, white. Good crop, free from disease; short haulm. Early.

9. Early Perfection (Wythes).—Small, kidney, eyes full, white. Light crop, free from disease; short and distinct haulm. Early.

10. Early Perfection (R. Veitch).—Medium, kidney, uneven in size and shape, eyes shallow, white tinged with pink. Very heavy crop, free from disease; short haulm. Early. Distinct from No. 9.

11. Eley's Early (Frost).—Medium to large, some kidney and some round, eyes shallow, white. Good crop, free from disease; short haulm. Early.

12. English Beauty (J. Veitch).—Medium, round, eyes shallow, white. Good crop, slightly diseased; short haulm. Early.

13. First of All (Goody).—Medium, round, eyes rather deeply set, pale pink. Good crop, free from disease; short haulm. Early. Stock slightly mixed.

14. Fishtoft Seedling (Johnson).—**A.M.** September 6, 1898. Large, flattish oval, eyes full, white with russety skin. Very heavy crop, free from disease; moderate haulm. Late. Fine quality when cooked.

15. Flourball (Johnson).—Large, round, eyes shallow, white. Good crop, free from disease; moderate haulm. Mid-season.

16. Genial (Ross).—Large, roundish kidney, eyes full, white. Good crop, free from disease; short haulm. Early or mid-season.

17. Generous (Ross).—Medium, round, eyes shallow, white with pink eyes. Good crop, free from disease; very tall strong haulm. Late.

18. Howlett's Early (Hurst).—Medium to large, round, eyes shallow, white. Heavy crop, free from disease; short haulm. Early.

19. Ideal (Sutton).—Large, round, eyes full, white with russety skin, handsome. Very large crop, free from disease; moderate haulm. Midseason or late.

20. Ivo (Curtois).—**A.M.** September 6, 1898. Medium, kidney, eyes full, white and russety skin, handsome. Heavy crop, free from disease; moderate haulm. Midseason or late. The best quality of all when cooked. This variety was brought by Major Curtois from the Canary Islands.

21. Leader (Myers).—Medium, flattish kidney, eyes full, white. Moderate crop, free from disease; short haulm. Early.

22. Lewin (Hunt).—Large, round, eyes deeply set, pale red. Heavy crop, free from disease; very tall strong haulm. Late.

23. Mayflower (Watkins & Simpson).—Medium, kidney, eyes full, white. Good crop, free from disease; short haulm. Very early.

24. McKinley (Collins).—Large, kidney, eyes full, white. Moderate crop, much diseased; short haulm. Early.

25. Minning's Favourite (Cockerill).—Large, round, uneven, eyes deeply set, white. Very heavy crop, free from disease; strong tall haulm. Late.

26. Miss Ellen Terry (Blinco).—**A.M.** Sept. 6, 1898. Medium to large, round, eyes shallow, white, handsome. Heavy crop, free from disease; moderate haulm. Late. Excellent quality when cooked.

27. New Main Crop (J. Veitch).—Large, flattish round, eyes shallow, white, handsome. Very heavy crop, free from disease; tall robust haulm. Late.

28. Ninety-fold (Sutton).—Large, some round, others kidney, eyes shallow, white. Heavy crop, free from disease; moderate haulm. Midseason or late.

29. Noble (Ross).—Large, round, eyes deeply set, white. Good crop, free from disease; immense haulm. Late.

30. Palmyra (Ross).—Small, round, eyes full, white. Good crop, free from disease; short haulm. Early.

31. Pierremont Seedling (Hurst).—Rather small, round, eyes

full, white. Very heavy crop, free from disease; tall haulm. Late.

32. *Pride of Tonbridge* (Hurst).—A.M. Sept. 10, 1895. Medium, kidney, eyes full, white with russety skin, handsome. Very heavy crop, free from disease; short haulm. Early or midseason.

33. *Prolific* (Johnson).—Large, round, eyes shallow, white. Heavy crop, free from disease; moderate haulm. Midseason.

34. *Purple Champion* (Kane).—Medium to large, flattish oval, eyes full, pale purple. Good crop, free from disease; moderate haulm. Midseason or late.

35. *Queen* (Fidler).—A.M. Sept. 6, 1898. Medium, flattish oval, eyes full, white, handsome. Heavy crop, free from disease. Late.

36. *Redhill Seedling* (Surrey Seed Co.).—Large, kidney, uneven in size, eyes full, white. Good crop, slightly diseased; large haulm. Late.

37. *Red Perfection* (R. Veitch).—Large, round, eyes deeply set, pale red and russety. Very heavy crop, free from disease; tall strong haulm. Late.

38. *Rentpayer* (Watkins & Simpson).—Small, pebble-shape, eyes shallow, very white. Good crop, free from disease; moderate haulm. Late.

39. *Ridgwell Invincible* (Ridgwell).—Large, round, eyes deeply set, white. Heavy crop, free from disease; moderate haulm. Late.

40. *Ringleader* (Sutton).—Medium, roundish kidney, eyes full, white. Heavy crop, free from disease; short haulm. Very early.

41. *Rough Diamond* (Collins).—Medium, round, eyes shallow, white. Light crop, free from disease; short haulm. Early.

42. *Sir Walter Raleigh* (R. Veitch).—Large, round, eyes deeply set, white russety skin. Heavy crop, free from disease; tall strong haulm. Late.

43. *The Cropper* (Hurst).—Medium to large, round, eyes shallow, white. Very heavy crop, free from disease; very tall strong haulm. Late.

44. *The Havelock* (Watkins & Simpson).—Medium, round, eyes full, white russety skin, handsome. Good crop, free from disease; rather large haulm. Late.

45. The Major (Webber).—A.M. Sept. 6, 1898. Large, kidney, eyes full, white with russety skin, fine shape. Good crop, free from disease; moderate haulm. Midseason or late.

46. The Rational (Collins).—Medium, kidney, eyes full, white. Good crop, free from disease; short haulm. Early.

47. Up to Date (Sydenham).—Large, round, eyes shallow, white. Enormous crop, free from disease; immense haulm. Late.

48. Variegated Ashleaf (Toogood).—Medium, round, eyes full, pale pink. Light crop, free from disease. Early. The haulm and foliage is deeply variegated with white, and is pretty as an ornamental plant.

LETTUCE GROWN AT CHISWICK, 1898.

Nine stocks of Lettuce were received for trial, all of which were sown in boxes on March 7, and when large enough were transplanted on to a warm border. With one exception all the varieties made excellent growth, in spite of the heat and drought. The Committee examined them on two occasions—viz. July 5 and July 22.

F.C.C.==First Class Certificate.

1. Continuity (Daniels).—Foliage heavily marked with dull red. Hearts medium size, firm, crisp, and of very good flavour. Stood the drought well without running to seed. Cabbage.

2. Crystal Palace (Watkins & Simpson).—**F.C.C.** July 26, 1898. Foliage pale green, slightly margined with pink. Hearts immense, very firm, crisp, and of good flavour. A remarkably fine variety that remained in good condition longer than any other, and sure to be a favourite in the future. Cabbage.

3. Drumhead (Watkins & Simpson).—A fine true stock of this old variety. Cabbage.

4. Early Market All Heart (Watkins & Simpson).—Foliage pale green. Hearts small, very firm, crisp, and of nice flavour. A very early close-growing variety. Cabbage.

5. Green-fringed (Carter).—Foliage bright green, beautifully cut and fringed at the margins. This variety does not form hearts, but the leaves are of fair flavour, and exceedingly ornamental. Cabbage.

6. Hicks' Hardy White (J. Veitch).—A fine true stock of this old favourite, equally good for spring or autumn sowing. Large crisp hearts were formed that stood the drought well. Cos.

7. Prince of Wales (Watkins & Simpson).—Very similar to Paris White. A first-class summer Lettuce. Cos.

8. Stanstead Park (Watkins & Simpson).—Of no use for spring sowing, but one of the very best for autumn sowing. Cabbage.

9. Sugarloaf Bath (J. Veitch).—Foliage bronzy green. Hearts large, firm, and of excellent flavour. Fine stock. Cos. An **F.C.C.** was given to Brown Sugarloaf in 1869, which is probably synonymous with the above.

FRENCH BEANS AT CHISWICK, 1898.

Eight varieties of French Beans were sent for trial, all of which were sown on deeply dug and well manured soil. With one exception all made good growth, and cropped freely. Growing plants were taken up to the Westminster meeting on August 9, and examined by the Fruit and Vegetable Committee.

A.M. = Award of Merit.

1. China Yellow Dwarf French (J. Veitch).—Height 10 inches. Pods long, straight, in large clusters. A great bearer. Very late; useful for late supplies.

2. Early Favourite (J. Veitch).—**A.M.** April 27, 1897. Height one foot. Pods long, straight, in large clusters. An early and heavy bearer.

3. Early Negro Longpod (Dammann).—Height one foot. Pods long, straight, in large clusters. A remarkably prolific variety.

4. Gibson's Dwarf (Gibson).—Same as Sir Joseph Paxton.

5. Golden Skinless Dwarf French (J. Veitch).—Height one foot. Pods moderately long, straight, thick and fleshy, in good clusters. A heavy bearer. If the pods are cooked whole in a young state they are excellent in flavour and very tender.

6. King of the Wax (J. Veitch).—Height one foot. Pods long, curved; of a rich golden-yellow colour. A free bearer, the best of its class.

7. Princess Runner Bean (J. Veitch).—Height about 5 feet. A climbing French Bean, producing an enormous crop of medium-sized fleshy pods of good flavour.

8. Waltham French Runner Bean (Sharpe).—Not a success.

REPORT ON ONIONS GROWN AT CHISWICK, 1897-98.

Sixty-nine stocks of Onions were grown for trial in the gardens. The ground had been deeply trenched and well manured in July 1897. The seed was sown in drills three feet apart on August 17, 1897. Early in March a row of each stock was transplanted one foot from the original row, and on March 18, 1898, another row was sown (out of the same packet as the autumn sowing), one foot from the transplanted row, so that the three rows of each stock were all one foot apart—viz. one (autumn sown) not transplanted, one (autumn sown) transplanted, and one spring sown. All the stocks germinated well, but the repeated dense fogs of the winter of 1897-98 made sad havoc with some of the varieties, while a few stood with little injury. The trial proved that many of the varieties usually sown in spring are fully as hardy for autumn sowing as the Tripoli type, when sown under exactly similar conditions; and, further, that the Onion maggot will attack both autumn and spring sown plants. A few bulbs of each stock were infested by this pest, but an application of 1 oz. sulphate of ammonia to each square yard checked the attack. In every case the transplanted autumn-sown bulbs were the largest and most shapely.

F.C.C. = First Class Certificate.

A.M. = Award of Merit.

1. A 1 (Sutton).—**F.C.C.** September 12, 1893. Very large, fine globe shape, skin pale brown. Excellent both from the autumn and spring sowings. Firm and heavy. A fine stock.

2, 3, 4, 5. Ailsa Craig (Watkins & Simpson, Hurst, Dobbie, Bowerman).—Very large, deep globe shape, skin dark brown. Firm and heavy. Very good from both autumn and spring sowings.

6. Alderton (Sherman).—Very similar to Nos. 23, 24, 25.

7. Anglo-Spanish (Hurst).—Very similar to Nos. 51, 52.

8, 9. Banbury Cross (Nutting, Hurst).—**A.M.** September 6, 1898. Large, flattish globe-shape, skin lemon brown. Very firm and heavy. Excellent from both autumn and spring sowings. Fine stocks.

10. Bassano Red Tripoli (Watkins & Simpson).—Large, flat round, skin pale purple. Many of the bulbs split into two or three. Better for autumn sowing.

11. Bartella Silver Skin (Hurst).—Small, flat round, skin silvery white. Of no value for autumn sowing, but very good for pickling when spring sown and not thinned out.

12, 13, 14. Bedfordshire Champion (Nutting, Watkins & Simpson, Hurst).—Medium size, globe-shape, skin deep brown. A firm heavy variety, more suited for spring than for autumn sowing.

15, 16. Blood Red (Hurst, Toogood).—Large, flat round, skin deep purple; moderately firm. Of not much value owing to the largest bulbs being very concave at the base; the best bulbs were produced from the spring sowing.

17, 18. Cocoa-nut (Watkins & Simpson, Hurst).—**A.M.** October 10, 1898. Large, cocoa-nut shape, skin brown. A remarkably fine heavy variety, equally good from both autumn and spring sowings.

19, 20. Cranston's Excelsior (Watkins & Simpson, Hurst).—Very large, deep globe-shape, skin dark brown. Firm, heavy; excellent either for autumn or spring sowing.

21. Crimson Globe (Dobbie).—Medium to large, deep globe shape, skin purple. Firm and heavy; the bulbs were much better from the spring-sown seed.

22. Danvers' Yellow (Watkins & Simpson).—Medium size, flattish globe, skin bronzy brown. Much better when spring sown, the autumn-sown plants not standing the winter well.

23, 24, 25. Eclipse (Sutton, Dobbie).—Very large, flattish globe, skin pale brown. Firm and heavy; better from the spring sowings; the autumn-sown ones did not stand the winter well.

26. Forde Defiance (Crook).—Large, flat round, skin deep brown. The spring-sown bulbs were the more shapely, many of the autumn-sown being concave at the base.

27. Forde Long-keeping (Crook).—An improved form of No. 22.

28, 29. Giant Lemon Rocca (J. Veitch, Watkins & Simpson).—Very large, deep globe-shape, skin lemon brown. A firm heavy variety, very good for autumn sowing, but of little value for spring sowing. Fine stock.

30. Giant Rocca Brown (Watkins & Simpson).—A darker-skinned form of No. 28.

31. Giant Rocca Tripoli (J. Veitch).—A slightly inferior form of No. 28.

32, 33. Giant Zittau (Watkins & Simpson, Hurst).—**F.C.C.** 1880. Large, globe-shaped, skin bronzy brown. Firm and heavy; very good for spring sowing, but not so suitable for autumn sowing.

34. Globe Tripoli (J. Veitch).—Very large, globe-shaped; skin varying from brown to red. This variety stood the winter badly, and the spring sowing failed.

35. Golden Ball (Nutting).—Very similar in all points to Nos. 8 and 9.

36. Golden Noble (Dobbie).—Large, globe-shaped; skin brownish yellow. Firm and heavy; better when spring sown; did not stand the winter well.

37. Golden Queen (Hurst).—Not a success from either autumn or spring sowing.

38. Golden Globe (Hurst).—Large, globe-shaped, skin a brownish yellow. Heavy and very firm; better for spring sowing, the autumn sown not standing the winter well.

39. Improved White Globe (Sutton).—A paler and excellent form of No. 38, and like it better when spring sown.

40. Improved Ailsa Craig (Hurst).—Not true.

41. Italian Tripoli (J. Veitch).—**A.M.** October 10, 1893. Medium to large, flat, round, skin silvery white. Unable to stand the winter, but excellent for spring sowing. Ripens very early.

42. Magnum Bonum (Hurst).—Large, globe-shaped; skin a deep bronzy brown. Heavy and very firm; excellent for autumn or spring sowing.

43. Monarch (Toogood).—Bulbs large, flat round shape. Heavy and firm. Received too late for sowing in the autumn.

44. New Golden Globe (Toogood).—Same as No. 38.

45. New Globe Winter (Laxton).—Medium to large, globe-

shaped, skin deep brown. Heavy and firm; better from spring sowings, the autumn sown not standing the winter well.

46. Nort Pale Red (Hurst).—Large, flat, round, skin brownish red. Heavy; better when spring sown, as the bulbs from the autumn-sown seed split up during the summer.

47, 48. Nuncham Park (Nutting, Hurst).—**A.M.** September 6, 1898. Large, flat, round, skin brown. Heavy and firm, but many of the bulbs are slightly concave at the base. Very good for autumn or spring sowing.

49. Prizewinner (Palmer).—Very similar to Nos. 51, 52.

50. Prizetaker (Green).—**A.M.** October 10, 1893. Large, deep, globe-shaped, skin pale brown. Heavy and firm. The best bulbs were from spring sowings.

51, 52. Rousham Park Hero (Watkins & Simpson, Hurst).—**A.M.** September 6, 1898. Large, globe-shaped, skin pale brown. Heavy and firm. Excellent for spring or autumn sowing. Fine stocks.

53. Sandy Prize White Spanish (Laxton).—Medium to large, flat, round, skin deep brown. Heavy and firm. Excellent for spring or autumn sowing.

54, 55. Selected Red (Dobbie).—Large, flat, round, skin deep purplish red. Heavy and firm; equally good for autumn or spring sowing.

56. Spanish Giant (Toogood).—Large, deep globe-shape, skin dark brown. Heavy and firm. A very distinct variety with deep pea-green foliage. Ripens late. Seed received too late for autumn sowing.

57. Southampton Champion (Toogood).—Very similar to Nos. 61, 62.

58, 59. The Queen (J. Veitch, Hurst).—**F.C.C.** August 11 1876. Same as No. 11.

60. The Sutton Globe (Sutton).—Very large, flattish globe-shape, skin deep brown. Heavy and very firm. Excellent for spring or autumn sowing.

61, 62. The Wroxton (Watkins & Simpson, Hurst).—**A.M.** September 6, 1898. Very large, deep globe-shape, skin brown. An exceptionally heavy and firm variety. Excellent for spring or autumn sowing.

63. The Wildsmith Exhibition (R. Veitch).—Very similar to Nos. 61, 62.

64, 65. Trebons (Nutting, Hurst).—**F.C.C.** August 11, 1876. .
Very large, fine deep globe-shape, skin pale brown. An
excellent, firm, and heavy variety; first class for autumn sowing,
not so good for spring sowing. Fine stocks.

66. White Globe (Hurst).—**F.C.C.** August 30, 1883. A
paler and good form of No. 38.

67. White Spanish or Port (Hurst).—An inferior form of
Nos. 51, 52.

68. White Naples Tripoli (J. Veitch).—Same as No. 41.

69. Yellow Globe (Hurst).—Same as No. 38.

REPORT ON TOMATOS GROWN AT CHISWICK, 1898.

Thirty-three new or comparatively new varieties were sent for trial, and nineteen of the best older ones were grown with them for comparison. The seeds were all sown on March 12, and the plants grown on and fruited in 10-inch pots. The hot season suited the plants admirably, all making good growth, and they were entirely free from any disease the whole season.

F.C.C. = First Class Certificate.

A.M. = Award of Merit.

1. Beauty of Sark (Pipon).—Very large, flattish round, smooth, and of good shape, averaging three fruits in a cluster; solid, with very few seeds; moderate bearer. Deep crimson.

2. Brockhampton King (Foster).—Large, flattish round, smooth and handsome, averaging three fruits in a cluster; solid and of good flavour; moderate bearer. Purplish crimson.

3. Campbell's Prolific (Russell).—Medium size, deep round, smooth, averaging five fruits in a cluster; solid, and of good flavour; heavy bearer. Deep crimson.

4. Challenge (Rolfe).—Very large, flattish round, smooth, averaging three handsome fruits in a cluster; solid, with very few seeds; fair flavour; good bearer. Fine crimson.

5. Crimson Ball (Watkins & Simpson).—Large, round, smooth and handsome; solid, averaging three fruits in a cluster; of good flavour, and with a remarkably thin skin; moderate bearer. Deep red.

6. Chemin Rouge (Watkins & Simpson).—A very fine stock of this popular variety. A great bearer.

7. Dreadnought (Newport).—Large, round, smooth, averaging four handsome fruits in a cluster; solid, and of good flavour; a heavy bearer. Crimson.

8. Dwarf Branching Tree (Barr).—Medium size, round, smooth, averaging two fruits in a cluster; of poor flavour. A strong grower but shy bearer. Purplish crimson.

9. Dwarf Golden Champion (Atlee Burpee).—Medium size, round, smooth, averaging four fruits in a cluster; solid, and of very sweet flavour; a good bearer. A yellow-fruited tree Tomato.

10. Early Evesham (Watkins & Simpson).—Medium to large, corrugated, averaging four fruits in a cluster; fairly solid, and a good flavour. A heavy bearer, and excellent for outdoor culture. Red.

11. Early Marvel (Toogood).—Large, flattish round, smooth; solid, and of good flavour. A heavy bearer. Deep crimson.

12. Early Ruby (Watkins & Simpson).—Medium to large; uneven, some being quite round and smooth and others corrugated; averaging five fruits in a cluster; solid, and of good flavour. An early and heavy bearer. Deep red.

13.—Fillbasket (Sutton).—Medium size, round, smooth, averaging six fruits in a cluster; solid, and of excellent flavour. Heavy bearer. Crimson.

14. Fordhook Fancy (Atlee Burpee).—Large, round, smooth, averaging three fruits in a cluster; solid, and of fair flavour. Good bearer; immense foliage. Purplish crimson.

15. Glenhurst Favourite (Barr).—Large, flattish round, smooth, averaging four handsome fruits in a cluster; heavy, solid fruit, of good quality. Free bearer. Bright crimson.

16. Golden Jubilee (J. Veitch).—F.C.C. May 26, 1897. Large, round, smooth, averaging four very handsome fruits in a cluster; solid, and of first-rate flavour. Heavy bearer. Yellow flushed with red.

17. Golden Princess (Barr).—Medium size, round, smooth, averaging five pretty fruits in a cluster; solid, and of good flavour. Heavy bearer. Bright yellow.

18. King's Seedling (Newport).—Medium to large, deep round, smooth, averaging four fruits in a cluster; solid, and of good flavour. Free bearer. Deep crimson.

19. Long Keeper (Barr).—Large, flattish round, smooth, averaging three fruits in a cluster; solid, and of fair flavour. Moderate bearer. Purplish crimson.

20. Lumps of Gold (Goody).—Medium to large, round, smooth, averaging five fruits in a cluster; solid, and of very good flavour. Heavy bearer. Bright yellow tinged with red. A good form of Blenheim orange.

21. Nield's Seedling (Watkins & Simpson).—**A.M.** July 31, 1896. Large, round, smooth, averaging five handsome fruits in a cluster; very heavy, solid, and of good flavour. A great bearer. Deep red.

22. Perfection (Barr).—**F.C.C.** August 19, 1884. A very good selection of the old and popular Reading Perfection.

23. Prolific (Sutton).—Medium size, round, smooth, very handsome, averaging six fruits in a cluster; solid, and of very sweet flavour. Heavy bearer. Very deep crimson.

24. St. Simon (Wilson).—**A.M.** September 6, 1898. Medium size, smooth, perfectly round and very handsome, averaging five fruits in a cluster; solid, and of fine flavour. A great bearer. Bright red.

25. Stirling Castle (Barr).—**A.M.** September 6, 1898. Medium size, round, smooth, averaging seven beautiful fruits in a cluster; solid, and of rich flavour. A great bearer. Crimson.

26. Supreme (Barr).—Very large, perfectly round, smooth, averaging five fruits in a cluster; solid, and of good flavour. Heavy bearer. Bright crimson.

27. The Favourite (Cooling).—Medium to large, round, smooth, averaging four handsome fruits in a cluster; solid, and of fair flavour. Moderate bearer. Bright scarlet.

28. The Burbank Preserving Tomato (Atlee Burpee).—Small and cherry-like, averaging six fruits in a cluster; flavour rather acid. This variety may be a good preserving variety in America, but is of little value here. A light bearer. Shining crimson.

29. The Yellow Peach (R.H.S.).—**A.M.** September 6, 1898. Medium to small, round, smooth, covered with a delicate peach-like bloom, averaging six pretty fruits in a cluster; solid, and of very nice and delicate flavour. Unequalled for dessert purposes. A heavy bearer. Soft lemon yellow.

30. The Tree Improved (Goody).—Medium size, corrugated, averaging four fruits in a cluster; not solid, and of inferior flavour. A poor bearer, and not worth growing.

31. Tree Tomato \times Conference (Goody).—Large, corrugated. A shy bearer, and not worth growing. Purple. There was no evidence of the cross having taken.

32. Upright Tree (Barr).—Large, flattish round, slightly

corrugated, averaging three fruits in a cluster; not solid, and of only fair flavour. Good bearer. Purple.

33. Up-to-Date (Cowley).—Medium size, round, smooth, averaging five fruits in a cluster; solid, and of fairly good flavour. A heavy bearer. Deep red.

34. Wonderful (Toogood).—Medium size, round, smooth, averaging four handsome fruits in a cluster; solid, and of good flavour. A heavy bearer. Rich crimson.

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PART III.

CHISWICK.

JULY 4, 1898.

THE President and Council again invited all the members of the Scientific, Fruit, Floral, Orchid, and Narcissus Committees to luncheon at Chiswick on Tuesday, July 4. The several committees number 188 members in all, and of these 106 accepted the Council's invitation, and ninety-eight actually sat down to lunch. Considering the very great distances from which some of the committee-men have to come, from Scotland, Ireland, Paris, Holland, Baden, Cornwall, the Scilly Isles, and Wales, this was accounted a very representative gathering indeed.

An excellent luncheon was provided by Messrs. Spiers & Pond. The President, Sir Trevor Lawrence, Bart., occupied the chair, supported by Mr. Thiselton-Dyer, C.M.G., F.R.S.; Dr. Masters, F.R.S.; T. A. Dorien Smith, Esq.; R. Milne Redhead, Esq.; Professor Farmer; Hugo Müller, Esq., F.R.S., &c., &c.

The *Gardeners' Chronicle*, in noticing the meeting, says:—
“It is not necessary to point out to the frequent visitors to the Drill Hall in what the work of the several committees consists; but for the sake of those at a distance, who are not familiar with the working of the Society, it may be desirable to allude to

the subject. Throughout the year the committees meet every fortnight, and give up the day, without fee or reward, to the business of the Society. They pass in review all the exhibits entered for certificates, and assess their merits with judgment and impartiality. That they do not always give universal satisfaction is to say that they are hard-working human beings. It is only the idlers who are never wrong, and most of us would prefer to be occasionally wrong with the conscientious hard-workers than negatively right with those who do nothing. The committees, moreover, supervise the numerous trials made in the experimental garden at Chiswick. In the old days of gloom and depression, when ruin seemed imminent, the committees continued their work as zealously as they do now under happier auspices. The Society is clearly under great obligations to the committees, and the Council did well to take an opportunity of expressing their recognition of the fact.

“ Sir Trevor Lawrence, a stalwart, who stuck to the Society in its evil days, and is never wanting when work is to be done, occupied the chair, and expressed his sense of the work done by the committees, whom he designated as the backbone of the Society. Sir Trevor threw out the suggestion that sooner or later it would be necessary to seek some other spot for an experimental garden, the present garden being too limited in area, too much built in, and the soil more or less exhausted. Sir Trevor concluded his speech by drinking to the health of the committees, and calling upon Mr. Thiselton-Dyer, the Director of the Royal Gardens, Kew, to respond.

“ Mr. Dyer, in reply, made a graceful and sympathetic speech, alluding to the evil days at South Kensington, and to the vigorous efforts (in which Mr. Dyer himself had no small part) which were necessary to reinstate the Society. The committees also had stuck to the Society throughout, and had proved themselves, as the President had said, the backbone of the Society. Mr. Dyer alluded to the first Temple Show, an undertaking initiated with some apprehension. The Covent-Garden growers and others were approached on the subject, and readily responded, and so the first Temple Show proved a success; and subsequent gatherings, favoured by weather, have been increasingly successful.

“ Alluding to the forthcoming Paris Exhibition of 1900, Mr.

Thiselton-Dyer threw out the suggestion that our fruit-growers should send periodically specimens of their produce, as it was abundantly clear that English-grown fruit was, as a rule, infinitely superior to that grown on the Continent.

"After a vote of thanks to the President the members dispersed to inspect the garden."

GARDEN PEAS.

By Mr. N. N. SHERWOOD, V.M.H., Master of the Worshipful Company of Gardeners.

[Read July 12, 1898.]

My purpose in preparing this paper can be stated under two heads. First, to give a short sketch of the history and development of the garden or cultivated Pea from the earliest known date, which will, I hope, supply details and information not generally known, and such as can be gleaned only from books and records to be found in the British Museum and other old libraries.

Secondly, to trace as far as can be done within a limit of time the development of the Culinary Pea, and to show something of the great strides made in the improvement of this deservedly esteemed vegetable during the last fifty years.

The Pea, whatever may have been its original form, is a plant of very great antiquity. I find that De Candolle in "*Plantes Cultivées pour leurs Graines*," about the years 1825-26, writes thus:—

"*Pisum sativum* was cultivated by the Greeks at the time of Theophrastus, who flourished from about 380 to 400 B.C., and was the author of one of the earliest treatises on botany. The name *Pisum* is derived from Pisa, a town of Elis, where Peas grew in great plenty. It is difficult to fix the exact site of this place, but it was near Olympia, in the N.W. division of the Peloponnesus, now the Morea." The English name is evidently a corruption of the Latin. Tusser in 1557, and Gerarde in 1597, spelt it Peason. Dr. Holland, in the reign of Charles I., spelt it Pease, and it was afterwards abbreviated to its present form.

The native country of the Pea, like that of most of our cultivated esculents, is not known for certain, but remains of Peas are said to have been found among the lake dwellers of the Bronze age in Switzerland and Savoy, the seeds being spherical in shape and smaller than those of our modern varieties. Monsieur Heer states that he also has found Peas amongst remains of the Stone age at Moosedorf; but he is doubtfully explicit, and gives only figures of Peas less ancient from the isle of St. Pierre. I have not been able to find any records of cultivated *Pisum sativum* in Ancient Egypt or among the Hebrews; but it has long been cultivated in India, and bears a Sanscrit name, and is designated by various very different names in other Indian languages.

The Pea was introduced into China from Western Asia, and Pent São, writing at the end of the sixteenth century, terms it "Mahomed Pea." A species appears to have existed in Western Asia, which came perhaps from the Southern Caucasus to Persia, where it was cultivated. The Aryan races are said to have introduced the Pea into Europe, but it was probably in India before the arrival of the Oriental Aryans. In all probability the Pea no longer exists as an indigenous plant, and when found is only in a quasi-wild state, showing modification and approaching other species. It may, I think, be assumed that the Pea undoubtedly came originally into France, Italy, and Spain from the East; and although it may be difficult to identify the lentils used in the days of Jacob and Esau with the Peas of later times, yet it is known that they were cultivated by the Greeks and Romans in the time of Pliny, who informs us that the Greeks sowed their Peas in November; but the Romans did not plant theirs until the spring, and then only in warm places lying well to the sun; for, says he, "of all things Peas cannot endure cold."

The time of the introduction of the Pea into Britain is as uncertain as its native habitat. I find in Traill's "Social England" that in 1066 Peas are said to be one of the chief crops grown in England. J. Thorold Rogers in his "History of Agriculture and Prices in England," under the heading of Garden Peas and Beans, writes thus:—"This kind of seed, under the name of Pottage, Green, Grey, and White Peas, is mentioned frequently in the 'Expenses of Collegiate and Monastic Houses' between the"

years 1403-1538, after which date such entries disappear. There are sixty-one entries of Pottage or Porridge Peas, probably Garden and Grey Peas. During this period the price was 5s. 11d. to 16s. per quarter. At Wormlington, in 1599, Hastings Peas were sold at 16s. per quarter. Better kinds of White, Pottage, or Sandwich Peas appear to have been sold at Winchester in 1601 at 32s. to 34s. per quarter, and in 1697 Boiling Peas of inferior quality sold at the same time and place at 24s. per quarter. There are other entries of Peas in the Manciple Book, and they formed part of the Fellows' diet when they sat at the Common Table.

"In 1617, at Theydon Gernon, an entry of three quarts of Setting Peas 4d. At Mendham, in 1626, twenty-seven bushels of Peas cost 1s. 4d. per bushel. In 1654, at Mount Holl, among other sorts, a half peck of Sandwich Peas sold for 2s. In 1698, in London, a half peck of Hotspur Peas realised 4s. In 1702, also in London, four quarts of Egg Peas were sold at 4d.; four quarts Dutch Admiral were sold at 6d.; and four pints of Dwarf Peas were sold at 6d."

The foregoing is interesting as affording some information as to the varieties of Peas in cultivation in early days.

The "Treasury of Botany" says that "before the introduction of the Potato into England Peas were largely eaten by the working classes, and a food so rich in nitrogen was doubtless the cause of the superior muscular development among the peasantry of the last century. So important was this crop held to be that in the letting of a farm the proportion of 'Siddan' land (*i.e.* Pea land) was always taken into consideration."

The following interesting information is from Rhind's "History of the Vegetable Kingdom" :—

"At the close of the thirteenth century the English forces were detained so long at the siege of a castle in Lothian that, having exhausted all their provisions, they contrived as a resource to subsist on the Peas and Beans cultivated in the surrounding fields," which shows they were an important field crop, and would lead to a belief that the Pea was then one of the staple articles for human food. In the privy purse accounts of Henry VIII. there is an entry to the effect :—"Paid to a man in rewarde for bringing Peas cods to the King's Grace, iiifs. viiij." (£1 11s. 8d.).

According to an old song of the time of Henry VI., Peas cods were sold in the streets of London. It runs as follows:—

Then into London I dyde me hye:
Of all the land it beareth the pryse.
Gode Peas cods one began to cry.

It is also worthy of note that Peascod Street in Windsor is so called because of the Peas cods which were grown and sold there. Thomas Tusser, in 1557, in the time of Queen Mary, in his "A Hundred Good Points of Husbandrie" writes:—

Good Gardener mine,
Make gardens fine;
Set Garden Peas
And Beans if ye please.

And in his directions for January:—

Dig garden now may ye at ease.
Set as a daintie the Rounceval Peas.

And in the following month he advises the farmer:—

Go plow in the stubble for now is the season
For sowing of Fitches of Beans & of Peason;
Sowe Rounceval timely & all that be grey,
But sowe not the White till St. Greogerie's Day.

Sowe Peason & Beans in the wane of the Moon—
Who soweth them sooner he soweth too soone—
That they with the planet may rest and rise,
And flourish with bearing most plentiful wise.

Both Peason & Beans sowe afore ye do plowe,
The sooner ye harrow the better for you;
White Peason so good for the purse & the pot,
Let them be well used else well ye do not.

Sticke plentie of Bowes among Rounceval Peas
To clamber thereon & to branch at their case,
So doing more tender & greater they wax,
If Peacock & Turkey leave jobbing their beks.

Green Peas appear to have been unknown to our Saxon ancestors, and in fact until after the Norman Conquest. Fosbrooke, in his "British Monasticum," says, amongst other vegetables, Green Pease were provided against midsummer for the nunnery at Barking in Essex. Green Peas became a popular delicacy in England soon after the restoration of Charles II., and, strange enough, I find in the year 1769 as much as a guinea a pottle, not

quite half a dish, was paid for late Peas on October 28 of that year.

I will endeavour to give you some idea of the sorts of Peas that were cultivated in England in the sixteenth and seventeenth



FIG. 58.—OLD WORLD PEAS. ROUNCEVAL PEASE: *PISUM MAJUS*.
(Facsimile from *Gerarde's "Herbal,"* 1597.)

centuries, so far as I have been able to get information. Fuller, writing in the reign of Elizabeth, says that it was customary to obtain the best varieties from Holland as fit dainties for ladies :

they came so far and cost so dear. It would therefore appear that some different and probably superior varieties were obtained from Holland than the Rounceval Pease mentioned by Tusser. Gerarde, in his "Herbal," 1597, says thus:—"There be divers sorts of Peason differing very notably in many respects. Some are of the garden and some of field, and yet both counted tame. Some with tough skins or membranes on the cods, and others have none at all, whose cods are to be eaten with the Peason when they are young, as those of Kidney Beans; others carry their fruit on the top of the branches, and they are esteemed and taken for Scottish Peason, which is not very common." I have had photographs taken of two of the Peas that are illustrated in Gerarde's "Herbal," where the following sorts are enumerated:—

- (1) *Pisum majus* (Rounceval Pease). (Fig. 58.)
- (2) *Pisum minus* (Garden & Field Pease).
- (3) *Pisum umbellatum* (Tufted or Scottish Pease).
- (4) *Pisum excorticatum* (without skins in the cods). (Fig. 59.)

This last is doubtless the remote ancestor of the 'Sans parchemin' Peas, which are so highly esteemed on the Continent, but which are little grown now in England.

In the "Art of Gardening," published in 1688, we are informed: "Pease are of divers kinds, and some of them the sweetest and most pleasant of all Pulses; the meaner sort of them have been long acquainted with our English air and soil; but the sweet and delicate sorts of them have been introduced into our gardens only in this latter age.

"There are divers sorts of Pease now propagated in England, as three several sorts of Hotspurs, the Long, the Short, and Barns' Hotspur, the Sandwich, five sorts of Rounceval, the Grey, White, Blue, Green, and Maple Rounceval. Three sorts of Sugar Pease, the large White, small White, and Grey Sugar Pease. The Egg Pease, Wing Pease, and Sickle Pease; whereof the Hotspur are the most early, pleasant, and profitable of all others. The Sugar Pease with crooked cods, the sweetest of all. The large white and green Rounceval, and the great Egg Pease we shall more particularly advise to be propagated in our gardens.

"The Hotspurs are the speediest of growth of any: that being sown about the middle of May will in six weeks' time return ripe again into your hands, no Vegetable besides being so quick

in its growth and maturity. Therefore let these be the first you sow, if sown in February or March : they will come earlier than any other sort sown before winter. But if you sow them in Sep-



FIG. 59.—OLD WORLD PEASE. PEASE WITHOUT SKINS IN THE CODS: *PISUM EXCORTICATUM*. (Facsimile from *Gerarde's "Herbal,"* 1597.)

tember, and can by fences of reed, or otherwise, defend them from extreme frosts, you may have ripe Peascods in May following.

"The large Sugar Pease (which many take to be a fair white sweet Pease succeeding the Hotspur, but erroneously) is a tender Pease planted in April, and ripe after midsummer: the cods are very crooked and ill-shaped, which, being boiled with unripe Pease in them, are extraordinary sweet. The greatest discouragement in raising these is that their sweetness attracts the small birds unto them, to their total destruction, unless carefully prevented; which is a sufficient argument of their pre-excellency.

"The large white and green Rounceval or Hastings are tender, and not to be set till the cold is over, and then not very thick, for they spread much and mount high, and therefore require the aid of tall sticks. Every one knows the worth of them.

"There is another very large grey but extraordinary sweet Pease that is largely propagated: it is tender but very fruitful, and deserves a large bed in your kitchen garden."

Gerarde further informs us that "Peas are set and sown in gardens and also in fields in all parts of England. The tufted Peas are in reasonable plenty in West Kent, about Sevenocke. In other places not so common. Wilde Pease do grow in pastures and arable fields in divers places, specially about the fields belonging unto Bishop Hatfield in Hertfordshire."

Parkinson, in 1629, in his "Paradisus Terrestris," says:—"There is very great variety of Marrowed Pease known to us, and I think more in our country than in others. Garden Pease are for the most part the greatest and sweetest kind, and are sustained with stakes or bushes.

"The kinds of Pease are these:—

The Rounceval.	Grey Pease.
Green Hastings.	Peas without skins.
White Hastings.	Scottish or Tufted, which some
Sugar.	call the Rose Pease, is a good
Spotted.	White Pease fit to be eaten.

"Early or French Pease, which some call the Fulham Pease because the ground thereat doe bring them soonest forward for any quantity, although sometimes they miscarry by their haste and earliness."

I think that the so-called French Peas would be nothing but

an ordinary White Pea, possibly brought from France and cultivated by the market gardeners at Fulham, but certainly not a distinct variety.

In 1710, or just eighty years after, "Salmon's Herbal" speaks thus of Peas manured or cultivated :—

"Of Pease there are several sorts :—

"The Early or Fulham Pease.

"Green and White Hastings.

"Rounceval.

"Grey Pease.

"Spotted.

"Pease without skins."

You will please observe that in eighty years there is no mention of any new variety having been introduced.

In 1787 Miller's "Gardeners' Dictionary" enumerates sixteen varieties of Peas, and says there are several other kinds known by names as distinct sorts; but as they are very subject to vary there can be no doubt they are merely seminal variations, and are not worth enumeration in this place. He says of the Sickle Pea that it is much more common in Holland than in England, being the sort most cultivated in that country; but in England they are only grown by curious gentlemen for their own table, and are rarely brought into market.

The English Sea Pea is found wild on the shore in Sussex and several other counties in England; and in the year 1555 it is reported that between Alford and Aldburgh it grew upon the heath, where nothing, not even grass, was ever seen to grow; and the poor people, being in distress by reason of the dearth of that year, gathered large quantities of these Peas, and so preserved themselves and families from starving.

I would here like to refer to some extracts from old cookery books on the subject of Peas.

1596. Thomas Dawson, in "The Good Housewife's Jewel," gives a recipe to make a close tarte of Green Pease, and another to make White Pease pottage.

1621. John Murrell in "A delightful daily exercise for Ladies and Gentlemen" gives: "To boyle chickens or capons with pease cods, take green pease when the pods be young, with butter, wa ter, peper, salt, and mace, the yokes of 2 or 3 eggs, six

spoonfuls of sacke, and as much vinegar. Dish up your capons upon suppets, then pour your pease cods and browth upon them, and serve to table hot."

1700. The "Art of Cookery" in verse says:—

The Sailor shipwrecked never can have ease
Till re-established in his Pork and Pease.

The following is a very interesting extract from an ancient cookery book compiled about the year 1390 by the master cooks of King Richard II. It is written in Old English, and I have had it translated into ordinary style that it may be easier for perusal.

[TRANSLATION.]

From "*The Toime of Cury*."—A roll of ancient English cookery, compiled about 1390 by the master cooks of King Richard II.

Perrey of Peas (Perrey, a dish in old cookery made chiefly of Peas, Onions, and spices).—Take Peas and boil them soft and cover them till they burst. Then take them and mash them in a cloth; take Onions and mince them, and boil them in the same liquor, and oil with them; add sugar, salt, and saffron, and boil them well. Then serve them forth.

From Warner's "*Antiquitates Culinatæ*."

Green Peas to Pottage.—Take young Green Peas and boil them with good beef broth, and take parsley, sage, savory, and hyssop, and a little bread, and pound all this in a mortar and some of the Peas with it; mix it with the broth, and put it in the pot with the other Peas, and let it boil together. Then serve it forth.

Green Peas unstrained with Herbs.—Take Green Peas and let them boil with good broth of beef, and take parsley, sage, and savory and hyssop, and cut them small. Put them in the pot and let them boil until thoroughly mixed. Colour it with saffron and serve it forth.

Green Peas and Bacon.—Take old Peas and boil them in good stock that bacon has been boiled in, then take them and pound them in a mortar, mix them with the broth and strain them through a strainer. Put them in a pot, and let them boil till they are thoroughly mixed. Then serve it forth, with bacon.

I think that we may assume that before the introduction of the Wrinkled Pea, which I shall shortly touch upon, the cultivated Peas of commerce formed two distinct classes, viz. such as have white flowers, with white or sometimes bluish-coloured seeds, commonly called Garden Peas, all included under the name "*Pisum sativum*"; and such as have coloured flowers and generally dun, grey, or speckled seeds: these are known as Field Peas, or *Pisum arvense*, which botanical authorities now regard as a varietal form of *Pisum sativum*. I would here remark that while rapid and wonderful strides have been made in horticulture during the Victorian era, and notably in the introduction of culinary vegetables, fruits, and flowers, the great attention and labour given to the work by gardeners and others is more clearly exemplified, in the vast improvement in Peas—greater, perhaps, than in the case of any other culinary vegetable, numbers of new varieties having fallen into oblivion through lack of merit, while the fittest have survived the test of time.

Our earliest garden Peas were for a number of years the round white-seeded varieties, such as the Early Charlton or Fulham, which is regarded as the parent of the Early varieties subsequently introduced. It had been in cultivation for years previously to the beginning of the present century, and up to within the last fifty years was extensively cultivated and esteemed as the best Early Pea for garden purposes in commerce. Most of the subsequent improvements were only the Charlton, considerably modified in character by selection. This may appear to some a startling statement, yet when we consider the clearly ascertained effects and changes which result from cultivation, it is not improbable, especially as the Pea is susceptible of marked variation. The Early Charlton or any other variety, if sown for several years, and the very earliest on the one hand and the latest on the other being selected for seed-bearing each season, the difference in the time of ripening between the two will ultimately become so great as to constitute two distinct varieties; and by sowing the early type on warm light lands the difference will be materially increased, not only in the time of ripening, but also in the habit of growth.

I now come to a most important period in the improvement of the Pea, viz. the introduction of the Wrinkled type. It is to Mr. T. A. Knight, of Elton, near Ludlow, that horticulture is

indebted for the development of the Wrinkled Marrow which imparted to the Pea a much higher table value.

In the "Philosophical Transactions" for 1799 appears an account of some experiments on the fecundation of vegetables, made by Mr. T. A. Knight, then President of the Royal Horticultural Society. Mr. Knight says:—"I had a Pea in my garden, which having been long cultivated in the same soil had ceased to be productive, and did not appear to recover the whole of its former vitality when removed to a soil of a somewhat different quality: on this my first experiment in 1787 was made. When the blossoms were matured I introduced the farina of a large and luxuriant grey Pea into the one half, leaving the others as they were. The pods of each grew equally well, but I soon saw that in those whose blossoms I had not fertilised the seeds remained undeveloped and finally withered. Those in the other pods attained maturity, but were not sensibly different to those of other plants of the same variety.

"In the succeeding spring, however, the difference became very obvious, for the plants rose from them with increased luxuriance, and the colour of their leaves and stems clearly indicated that they had changed their whiteness for the colour of the male parent, the seeds produced in autumn being dark grey. By introducing the farina of another white variety (or, in some instances, by simple culture) this colour was easily discharged, and a numerous variety of new kinds produced, many of which were in size and every other respect much superior to the original white kind, and grew with excessive luxuriance, some to the height of more than 12 feet. I observed a stronger tendency to produce purple blossoms and coloured seeds than white ones, for when I introduced the farina of a purple blossom into a white one the whole of the seeds the next year became coloured; but when I tried to discharge this colour by reversing the process a part only afforded plants with white blossoms, this part sometimes occupying one end of the pod, and being at other times irregularly interspersed with those which when sown retained their colour.

"As the offspring of a White Pea is always white unless the farina of a coloured kind is used on it, and as the colour of the grey one is always transferred to its offspring, it occurred to me, that if the farina of both were mingled or applied at the

same moment the offspring of each could be readily distinguished.

"My first experiment was not altogether successful, for the offspring of five pods (the only ones which escaped the birds) received their colour from the coloured male. There was, however, a strong resemblance to the other male in the growth and character on more than one of the plants, and the seeds of several closely resembled it in everything but colour. In this experiment I used the farina of a White Pea, which possessed the remarkable property of shrivelling excessively when ripe; and in the second year I obtained white seeds from grey ones, above mentioned, perfectly similar to it. I am strongly disposed to believe that the seeds were here of common parentage.

"Again I prepared blossoms of the little Early Frame Pea. I introduced its own farina, and immediately afterwards that of a very large and late grey kind, and I sowed the seeds thus obtained. Many of them retained the colour and character of the small Early Pea, not in the slightest degree altered, and blossomed before they were 18 in. high, whilst others (taken from the same pods), whose colour was changed, grew to the height of more than 4 ft., and were killed by the frost before any flowers appeared." In this way were obtained Knight's Green and White Wrinkled Marrow Peas.

In the "Transactions of the Horticultural Society," 1817, appears on page 87 another paper, On the Prevention of Mildew, by the President, Mr. Thomas Andrew Knight, in the course of which he says :—

"This led me to the following method of cultivating the Pea late in autumn, by which my table has always been well supplied in September and October as in June and July, and my plants nearly as free from mildew.

"The Pea, which I have always planted for autumnal crops, is a very large kind, of which the seeds are much shrivelled, and which grows very high: it is now very common in the shops of London, and my name has, I believe, been generally attached to it. I prefer this variety because it is more saccharine than any other, and retains its flavour late into the autumn." This was undoubtedly Knight's Tall Wrinkled Pea, afterwards sent out as British Queen.

Some experiments were also made by Mr. John Goss, bearing date October 15, 1822.

"I have raised some new varieties of Peas. In 1820 I crossed the Prolific Blue with pollen of a dwarf Pea, and obtained three pods of seeds. On opening them I found that the colour, instead of being a deep blue like the parent, was a yellowish-white like the male. These white seeds produced some pods with all blue, and some with white seeds and some with both colours mixed." I can find no record as to when these Peas were sent out, or if sent out, by what names.

It is therefore quite certain that we are indebted to Mr. Thomas Andrew Knight, President of the Royal Horticultural Society, for the introduction of the Wrinkled Pea, and that he obtained them by crossing some of the round White and Grey sorts. From their remarkable wrinkled appearance, together with the peculiar sweetness they possess, Knight's Marrow Peas may be said to have originated a distinct class of Garden Peas, possessing qualities which, together with their general productiveness, rendered them a valuable acquisition both to cultivators and consumers. Knight's Peas were therefore the origin of the numerous family of Wrinkled Peas that have succeeded them, both dwarf and tall, early and late.

It now remains to follow the development of the Wrinkled Pea after Mr. Knight's introductions. I have failed to discover when these Peas were first introduced to commerce, and the earliest mention of them I have been able to trace is in Page's "Prodromus," 1817, which gives the names of twenty-three varieties of Garden Peas, among them Tall Marrowfat White, Tall Marrowfat Green, and Tall Knight's Marrowfat; but no clue is given to the colour of the seeds. They were also offered by Messrs. Richard Gregory & Son, of Cirencester, in the year 1818.

Henry Miller, in "The History of Cultivated Vegetables, 1822," says:—"The principal kinds of Peas are Early Frame, Early Charlton, Dwarf Imperial, Dwarf Spanish, Blue Prussian, White Prussian, Sugar Peas, White Rounceval, Rose Crowned, Knight's Superb," but here again it is not stated if it is tall or dwarf, white or blue seeded.

I think we may assume as certain that Mr. Knight, in his experiments, found both Tall and Dwarf Peas in the same pods, and that these gradually became known to gardeners and Pea growers, and were generally quoted in seedsmen's catalogues about 1820.

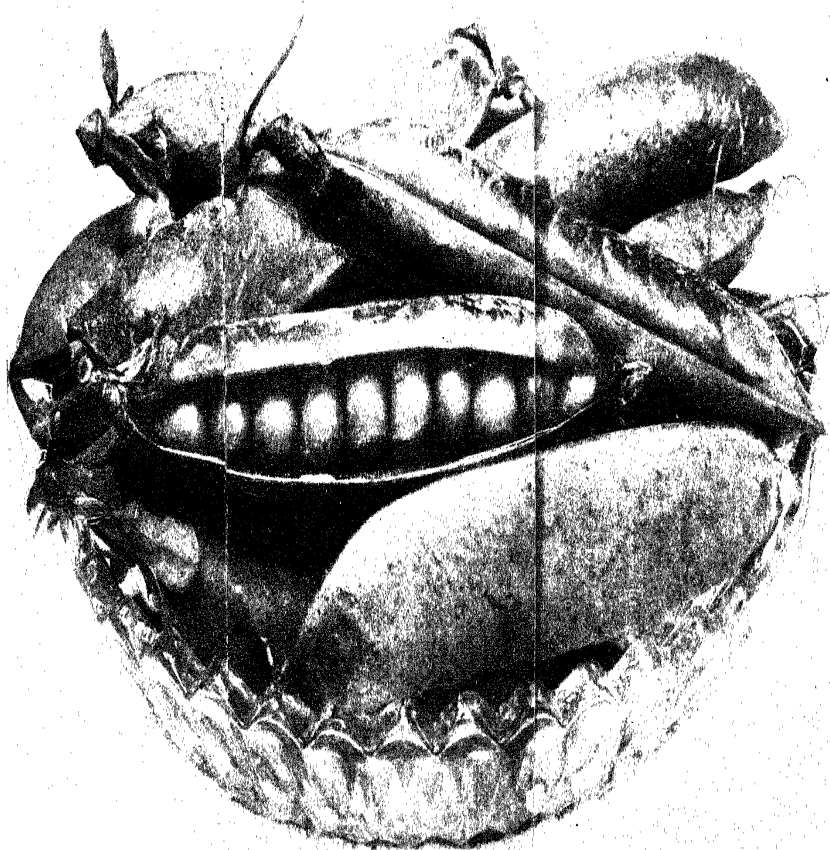


FIG. 60.—SUTTON'S DWARF DEFYANCE.
(From a photograph, showing natural size.)



In the "Gardeners' Magazine" for 1826 I find an "Historical Notice of two varieties of the Garden Pea," by T. H. Masters, Eden Nursery, Stoke Newington; one being Masters' Imperial Marrow, raised by Mr. W. Masters, of Canterbury, a hardy green Marrow-fat Pea, 5 feet high.

In the year 1836 Lawson's "Agricultural Manual" describes "Knight's Dwarf White Wrinkled Marrow as producing pods in pairs, from two and a half to three and a half inches long, well filled and terminating abruptly at both ends; the Peas on an average about three-eighths of an inch in diameter, flattened and very much wrinkled; colour white and sometimes of a greenish tinge; height 3 feet.

"Knight's Tall White Wrinkled Marrowfat: Pods larger and rather more bent than the last; Peas exactly similar; height 7 feet.

"Knight's Improved White Wrinkled Marrow: Pods similar to those of the Tall and Dwarf variety, but much sweeter and more prolific.

"Knight's Dwarf Green Wrinkled Marrowfat: Pods in pairs, 3 inches long by $\frac{3}{8}$ inch broad, flattish and very slightly bent; the Peas, which are of a light bluish-green, differ only from the White Marrow in colour; height 3 feet. Medium prolific.

"Knight's Tall Green Marrowfat: Similar in shape and colour to the last-named variety; height 7 feet. Very prolific."

These Peas of Knight's, the Tall White and Tall Green, were no doubt the parents of the British Queen and Ne Plus Ultra, and the Dwarf Green and Dwarf White of the Alliance and Climax types, names which were first catalogued in 1849-50.

I believe I am correct in stating that a gardener named Fairbeard, in the district of Sittingbourne, cross-fertilised some Peas, and found in the same pod both Round-seeded and Wrinkled varieties. One of the former was distributed as Champion of England, and one of the latter as Harrison's Glory.

Dwarf Knight's Marrow Pea was also raised by a gentleman's gardener in the vicinity of Sittingbourne. It is nearly the same height as the Blue Prussian, but in all other respects—even to the shrivelled appearance of the seed—it resembles the very excellent Pea raised by the indefatigable President of the Royal Horticultural Society, Mr. T. A. Knight.

In 1850 Dr. Maclean, of Colechester, commenced to cross-fertilise Peas, and without hesitation I may say he was the first to introduce a real improvement in the Wrinkled Pea in various distinct classes. The firstfruits of his work appeared in 1859, when Mr. Charles Turner distributed Sea Green, Epicurean, Mons. Soyer, and Princess Royal. In this year Messrs. Jas. Veitch & Sons sent out their Veitch's Perfection, which has held its place ever since as one of the best medium height Wrinkled Peas in cultivation. I have no doubt it is a descendant of Knight's Dwarf Green Wrinkled. Later appeared Advancer, Prince of Wales, Premier, and Little Gem, this last being the first very dwarf Wrinkled Pea, growing to a height of from 15 to 20 inches. All Dr. Maclean's seedlings were subjected to a very rigid selection before being put into commerce, and this fact accounts for their character being so well maintained.

Laxton and Culverwell, followed by Eckford, are the names of successful cross-fertilisers : to the former we are indebted for a peculiar type of Pea, a round seed with a very slight indent, the first of this class sent out being William the First, the object being to get a very early blue-seeded indented Pea of the same earliness as the Sangster type with a blue seed, or in other words with a Wrinkled Pea flavour. This type of Pea is most difficult to keep true on account of the slight taint of the Wrinkled Pea in the breed, which causes it to run back to the Round variety. Mr. Laxton sent out a number of Peas, such as Laxton's Prolific, Fillbasket, Supreme, William Hurst, Dr. Hogg, Omega, and others.

To Mr. Culverwell we are greatly indebted for the introduction of some of the finest Peas sent out within the last thirty years. He informs me that his first success was a cross between Laxton's Supreme and Veitch's Perfection, from which he obtained his Telegraph. He says that he does not think any Pea has produced so many varieties as this one. Witness the many selections made from it :—Telephone, Pride of the Market, Stratagem, Duke of Albany, which Mr. Culverwell considers the finest *Exhibition* Pea there is ; but the Telegraph the best *Market* Pea, being so great a cropper and so very hardy. He considers the best Pea ever raised for productiveness was Autumn Giant, but the pods would not stand the sun. This

was a cross between Culverwell's Prolific and Telegraph. These various Peas have been sent out by Messrs. Charles Sharpe & Co., Messrs. Carter & Co., and Messrs. Hurst & Son.

Messrs. Sutton & Sons have introduced within the last ten years some wonderful improvements in Peas. I find that in 1841 the principal Peas offered by that house were Blue Prussian, Woodfords, and Scimitar. They have been selecting seedling Peas with marked success, both for earliness, size, and shape of pod. The sorts introduced by them have been May Queen, Empress of India, Forcing, and Excelsior, &c.

I believe the aim of this firm has been to replace the Round-seeded varieties with Peas of dwarf growth, Wrinkled, equally early, and producing extra large pods. Of such they have introduced Royal Jubilee, Perfection, Windsor Castle, Late Queen, Magnum Bonum Marrowfat (Fig. 61), and Dwarf Defiance (Fig. 60).

To illustrate the extraordinary advance made in Peas within the last fifty years, I have inserted figures of two of Messrs. Sutton & Sons' latest introductions (Figs. 60 and 61) and one of my own (Fig. 62), in order that they may be compared with the Old World Pease figured previously from photographs I have had taken for this paper from Gerarde's "Herbal" of the year 1597.

It may interest my readers to be made aware of the great care taken by seed merchants to save stocks of Peas true to character. In taking measures to obtain a pure stock of a variety, what is known to be a good one is sown, and then, when the plants are large enough to show their character, every plant not true to the type which displays itself during growth—technically called a rogue—is most carefully taken out. In this way a quantity of seed of the right character is obtained; it is sown a second year, the produce is again rogued, and in this thorough manner sufficient seed is procured to sow some acres, and so on, until enough is obtained to offer the variety to the public. The wholesale seed merchants enter into agreements with farmers to sow so many acres of Peas, the seed merchant supplying the stock seed they have selected with so much care; and they assist the farmer in securing purity of type by sending competent men to go over the fields at certain times and remove any plants which are untrue to character.

When the Peas are harvested and threshed out they are sent

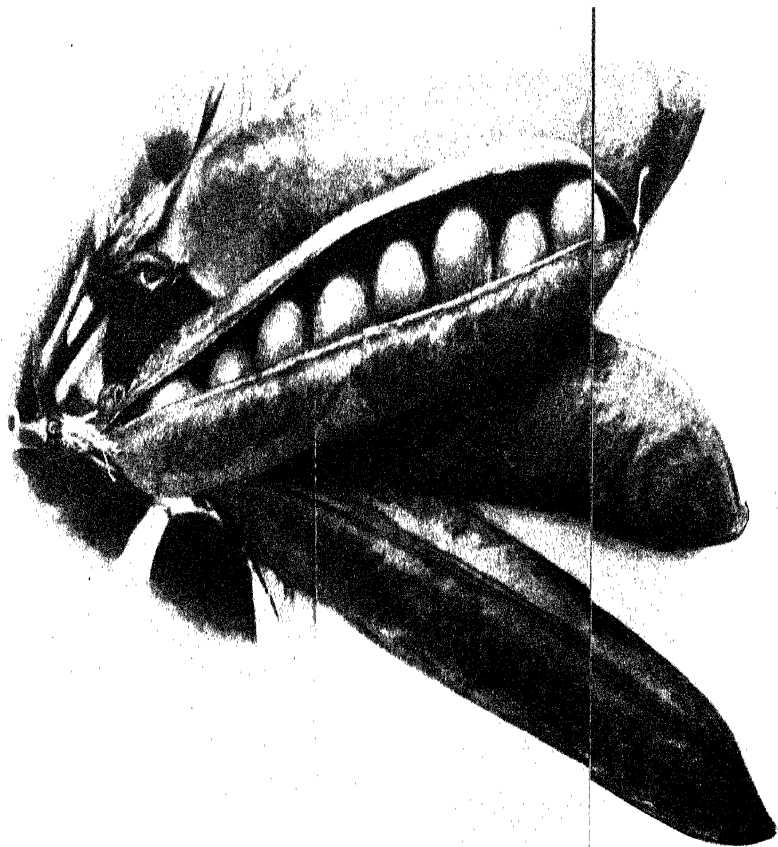


FIG. 61.—SUTTON'S MAGNUM BONTON MARROWFAT
(From a photograph, showing natural size.)



FIG. 62.—HURST'S 'INCOMPARABLE' MARROWFAT PEA.
(From a photograph, showing natural size.)

to the warehouses of the seed merchants, who employ often hundreds of women and girls to hand-pick the Peas; for, although the most perfect machines have been invented to take out small seeds or broken Peas, it is impossible to take out worm-eaten or discoloured Peas by any other than hand labour. These women come each autumn to the seed warehouses after the hop-picking ends.

It would not be possible to arrive at any definite number of acres of Peas grown for seed in this country, still less of the acres cultivated for picking green for market; in both cases they would amount to many thousands of acres.

Peas for such London markets as Covent Garden, the Borough, and Spitalfields are chiefly grown in Surrey, Middlesex, Kent, and Essex. The great aim of the market gardeners is to get them put on the market as early as possible, as often 12s. and upwards a bushel is paid for the first Peas, and in a few days they drop to half that price; so one can see the necessity for getting early and pure stocks for cultivation.

Enormous quantities of Peas are grown in the Evesham district of Worcester, and also at Selby in Yorkshire, the land in both districts being found particularly suitable for Pea growing, and these are sent to London, Manchester, and Liverpool, or, in fact, to any market where there is a prospect of securing the highest price.

To show how certain varieties die out and are superseded by others, I find in 1877-8 ninety-seven varieties quoted in catalogues; in 1887-8 seventy only of these varieties are still quoted; and in 1897 only forty-six of them are found remaining; and yet the names of Peas are ever increasing owing to the constant announcement of new varieties, or shall I say old friends with new names? There are quoted now in English catalogues some 625 names. I need hardly say that they may be easily reduced to one fourth that number, as so many are only synonyms well known to those who test them each year; but it is not my intention to apply the pruning-knife, as I should most likely bring about my head a hornet's nest of protests from those who do not agree with me. I may say that we have nearly 700 rows of Peas for comparison this season in our own trial grounds in Essex.

Within the last fifteen years quite a new industry has sprung

into existence, namely, the growing and disposing of Blue Boiling Peas. These are sold in the large manufacturing and colliery towns to the extent of many hundreds of quarters. They are used in the winter season as a vegetable, and properly cooked are a good substitute for fresh green Peas. They are also sold to workmen early in the morning hot from stalls, and served with butter and salt. Many hundreds, I may say thousands, of acres are used to grow these Peas, and as they are mostly hand-picked it employs an immense number of women and girls to do this work.

I wish to say a few words on the great difficulty in cross-fertilising and raising new Peas. The operation is one requiring the utmost care and the finest touch in properly and successfully manipulating the flowers. This information has been given me by a friend of mine who has made the matter his particular study.

The flower of the variety selected as the seed parent should be secured some time before it approaches the opening stage, as if not operated upon at the right time it may become self-fertilised. Having selected the two varieties of Peas to be crossed, the operator carefully opens the undeveloped petals of the seed parent, removing delicately and carefully by means of forceps the undeveloped anthers upon which appear the pollen grains, but which at this stage are not active. The next process is to take the other bloom selected just as the pollen grains are maturing upon the anthers, and by the assistance of a fine camel's-hair brush carefully dust with pollen the stigma of the seed-bearing blossom; when the viscid substance upon the stigma dissolves the pollen grains they pass into a tube below, the lower end of which is connected with each ovule contained in the ovary; and as the dissolved grains pass into the ovules fertilisation is completed.

The operation thus performed, the operator carefully covers up the stigma with the petals of the flower to prevent contact by the elements, or by insect agency, &c., and the fertilised blossom is covered with a thin piece of muslin or cotton shading.

The act of crossing has been performed with marked success, and the changes thus brought about will manifest themselves in successive generations. Supposing a fertilised pod produces six seeds, and if each of the six seeds be sown and they germinate, and the produce of each of the six seeds be sown by themselves,

it is pretty certain each row, though sown with seeds which are the produce of an undivided plant, would produce plants showing great diversity in habit of growth, earliness, and in the character of the pod and seeds. As a general rule, after reaching this point it is necessary to select the most promising plant in each of the six rows, and by succeeding selections fix the character of the particular variety. It very likely happens that the best type obtained from a particular cross is found in selections made in the fourth and fifth year after the cross was made. By the same process of cross-fertilisation, the Sweet Pea has been vastly improved, and the varieties largely increased.

Before closing my paper, I think it may interest my hearers to know what I consider the best Peas that have been introduced into commerce up to the present time, or perhaps I should say the best Peas that exist now for purposes of growing (1) in gentlemen's gardens and also (2) for market gardens. Possessing a trial ground where every sort of Pea introduced has been grown, and all their different characteristics and qualities carefully noted, I think you will agree that from inspection year by year I am able to form a pretty good estimate of what are the best varieties according to our tests. It is quite possible, however, that my estimate may not be generally admitted to be correct; neither do I claim that it should be so: I am only expressing my own opinion, in the hope that it may be of service to Pea growers in general.

On the following page will be found the lists of what I consider to be the leading varieties at the present time :—

(1) SOME OF THE BEST
WRINKLED VARIETIES FOR
GARDENS.

First Early—

Gradus.
May Queen.
Exonian.
Dr. Hogg.
Sutton's A 1.

Very Dwarf—

William Hurst.
Chelsea.
English Wonder.
Notts' Excelsior.
Sutton's Favourite.

*Second Early and Early
Main Crop—*

Duke of York.
Sutton's Empress of India.
Prince of Wales.
Duke of Albany.
Triumph.

Main Crop and Late—

Stratagem.
Daisy.
Sharpe's Queen.
Autocrat.
Captain Cuttle.
Veitch's Perfection.
Ne Plus Ultra.
Sutton's Magnum Bonum.

(2) SOME OF THE BEST
ROUND-SEEDED VARIETIES
FOR MARKET.

First Early—

William the First.
Eclipse or Alaska.
Sangster's Improved.
Ameer (Laxton's).

Second Early—

Telegraph.
Lye's Favourite.

Main Crop—

Gladiator.
Pride of the Market.

ON THE ORIGIN OF SPECIES IN NATURE, AND SUGGESTIONS FOR EXPERIMENTS TO INDUCE VARIETIES TO ARISE UNDER CULTIVATION.

By the Rev. Prof. G. HENSLOW, M.A., F.R.H.S., V.M.H.

[Lecture delivered at the Gardens of the Royal Horticultural Society, Chiswick, July 13, 1898.]

INTRODUCTION.—WHAT IS A “SPECIES”?—It is a term used by botanists to indicate a certain amount of differences between one and another kind of the same genus. Hence a species is known by a collection of morphological characters, presumed to be constant, and taken from any or all parts of a plant. A variety only differs from a species in having a less amount of differences. There is no recognised standard as to the amount or number of differences which separate varieties from species; hence systematic botanists have greatly differed in their use of these terms. The point to be remembered is that neither one nor the other is a fixed entity in nature; but a so-called variety or species can change its form under altered circumstances; and the direct cause of changes of form or of variations of structure in plants is a change of environment.

A good example of “forms” being assumed by a common plant under different soils, &c. may be seen in the knot-grass (*Polygonum aviculare*, L.). Thus Sir J. D. Hooker describes the varieties:—“*P. aviculare*, L., proper; *P. littorale*, Link, Littoral; the passage to *P. maritimum*, L., sea-shores; var. *agrestinum*, Jord., the common robust field form; *arenastrum*, Boreau, a sand-loving prostrate one; *microspermum*, Jord., a small fruited one; and *rurivagum*, Jord., a wayside one; sub-species, *P. Roberti*, Loisel, sandy shores.” *

In Nature, new varieties, Sir J. D. Hooker observes, are mostly found on the confines of the geographical area of the species: and when plants are grown for experiment in widely different regions, they are generally found to lose their special features, and to take on those of the plants among which they now live; so that lowland forms assume alpine or arctic features

* Hooker's *Student's Flora*, p. 346.

when grown at high altitudes and latitudes. Plants of arid districts gradually lose their spiny and poverty-stricken appearances when grown in a rich and moist soil.

Hence it is obviously more likely that one would induce plants to vary by transferring them to as different external conditions as possible. Mr. Elwes informed me that the many bulbous plants he brought from the East change so in all their parts in his garden, that they can scarcely be recognised after three or four years; as, e.g., *Tulipa Kolpakowskyana*.* Of course, great differences exist in the natural capacity of plants to change; some are very refractory, others supply numerous cultivated varieties; but every experience tends to show that all plants can vary if a sufficiently active environment be provided to call out their latent powers of response.

ILLUSTRATIONS OF RAPID CHANGES IN STRUCTURE.—
From Dry to Moist Conditions.—One of the most marked and comparatively sudden alterations of structure that take place on a change of environment is seen in that of inhabitants of dry, poor soils with a dry atmosphere, when they are removed to a moist one. Thus a common feature of not a few plants of the former condition is to be spinescent; whether the spines be branches, as in the Rest-harrow, or leaves, as in the Barberry. Experiments have shown that if the Rest-harrow (*Ononis spinosa*) be grown, either from seed or from cuttings, in a moist soil and atmosphere, the spines soon cease to be formed, and the plants assume more or less the character of the wild and spineless form, *O. inermis* or *O. repens*. Similarly the leaf-spines of the Barberry will develop out into true leaves under similar conditions; while hairiness, a characteristic of drought, disappears.

Analogous results have occurred when wild plants bearing spines have been cultivated in, of course, a good soil: when they become non-spinescent, as Pears and Plums and some Roses.

From an Aquatic to a Land Soil.—Many plants are amphibious, i.e., though usually aquatic and wholly or partly submerged, they can grow on land equally well by adapting the minute structures of their roots, stems, and leaves to either medium, air or water. If they be transferred from one to the

* *Gard. Chron.*, 1896, p. 586. Figs. 93, 94.

other, then all the submerged foliage dies, but new foliage is immediately developed suitable to the changed medium.

A common cultivated example is seen in *Richardia Ethiopica*, usually grown in pots, but it is an aquatic plant in its native habitat.

There is no apparent reason why water-lilies should not be grown in a garden border; if the experiment be made, either by sowing the seed or by gradually adapting the thick rhizome to put out suitable roots, by supplying it with a wet soil at first. The experiment is worth trying, either with water-lilies or any other aquatic plants which might be thought suitable for the garden.

As water has the effect of producing degeneration of the tissues in aquatic plants as compared with land plants, they often grow stronger when on land than when in their normal condition under water.

Changes between an Erect and Prostrate Habit.—The erect habit of growth is common with plants growing thickly together, but if they are isolated on an exposed surface they will often assume a prostrate habit. This is due to the ground being warmer than the air above it. We may describe this tendency by the term "thermotropism," i.e. "a turning heatwards." This response to an inequality of temperatures will account for the plants acquiring a prostrate habit.

Thus *Malva sylvestris*, the common Mallow, when growing in shady places with other herbs will be erect, but on the roadsides it becomes perfectly prostrate. It is so prevalent in this condition on the limestone of Malta, that it has been named *M. Nicænsis*, but it is simply a prostrate and more hairy form of the common Mallow. A very familiar example is seen in the lesser Bindweed, *Convolvulus arvensis*, for this plant is a true stem climber when growing among other erect plants, but assumes a thoroughly prostrate habit when growing on banks by roadsides, &c.

Similarly a prostrate form is characteristic of high Alpine plants, and when lowland plants are grown in those regions they, too, then become prostrate in habit.

Fleshy Types.—Many seaside plants are remarkable for the fleshy character of their leaves and stems, as *Plantago maritima*, Samphire, &c. This is due to the presence of salt, and it can be

imitated by watering inland plants with a saline solution. Hence it is customary to give salt to some maritime plants which are cultivated, as Asparagus and Sea Kale; while all the cabbage tribe would doubtless be assisted by it, if it were thought necessary, as they are natives of sea-cliffs; but they retain their fleshy character by heredity.

Several plants growing at Bad Nauheim, 200 miles from the nearest sea-coast, have acquired a fleshy texture in consequence of the abundance of saline waters there.

Variegation.—This phenomenon is produced by several causes; though it is not quite clear why some plants with a variegated foliage may grow in the same soil with others not variegated.

The general absence of colour has been called "Chlorosis," and the disease appears to be the result of the absence or deficiency of certain ingredients in the soil requisite for a vigorous growth and a fully green colour.

Thus, a variegated strawberry remained constant so long as it grew in a dry soil; but when it was transferred to a cold or moist one, its variegation quickly disappeared. A variegated laurel grew well in a not very deep soil for three years, but when the roots could penetrate into the sub-soil composed of chalk, the leaves became green again.

Professor A. Church has investigated the subject, and finds that Chlorosis may be divided into four groups—(1) *Etiolation*, due to insufficient light; (2) *Albinism*, when there is a relative excess of potash and deficiency of lime; (3) *Icterus*, due to a deficiency of iron; (4) *Wheat-yellow*, on account of a deficiency of potash.

Mr. Penhallon found that *Peach-yellow* was due to a deficiency of magnesia.

Following these discoveries, it seems obvious that experiments might be made in which soils deficient in the above-mentioned ingredients might be used, to see if variegation could not be induced. As, however, all cases of variegation are abnormal and unhealthy conditions, it is probable that a permanency would be difficult to secure, unless the soil remained of the same character to produce it. Still, as M. Carrière observes of plants, "everything tends to become hereditary," therefore variegations may in time become so fixed in the constitution,

that they might not disappear even in a good soil. Thus coleus, hollies, pelargonias, &c., appear now to be pretty well fixed in the various colorations of their foliage.

Dwarfing.—There are many more dwarf annuals than perennials in cultivation. This is only because the latter are not usually raised from seed.

On the appearance of a dwarf, it is necessary to isolate it; so that it be not crossed with taller ones. Then one must keep selecting seed from the shortest of the seedlings, till the "nanism" be fixed. This fixing varies from one to six years; but it is not known why there should be this variation in time.

The methods of producing dwarfs are possibly several. The following have been suggested. Bearing in mind that the object is to "arrest vegetative growth," anything that will do this may produce dwarfing, not only in an individual, but in its progeny.

By autumn sowing (Aug.—Sept.): When it is too late for a plant to flower, it produces a more compact vegetation. If it be sown in spring, successive prickings out and transplanting, so that each plant grows freely, will result in strong thick-set plants. "This process will favour the development of the lower ramifications at the expense of the main stem; we thus create an individual, comparatively dwarf. If now we collect seed from plants thus grown, and if we give the same treatment to them as to their parents, we shall obtain year after year 'plants which we shall have made to develop a certain tendency to nanism.' That is, after some years, they will be more apt to produce dwarf varieties." Verlot adds that the greater number of cultivated dwarfs were of varieties sown in autumn; or if in spring, they have been subjected to successive transplanting. Of the first he mentions eleven varieties, such as *Calceolaria plantaginea*, *Senecio cruentus* (garden cineraria), *Oenothera Drummondii*, *Scabiosa atropurpurea*, *Iberis umbellata*, &c.

Of those sown in spring-time, he mentions *Impatiens balsamina*, *Callistephus sinensis*, *Tagetes patula*, *T. erecta*, and *T. signata*.

With regard to the procuring of dwarfs by fecundation of flowers, ordinary crossing has usually an opposite tendency in making the offspring more vigorous; but Mr. McNab found that the best dwarf varieties of *Rhododendron* were obtained by using pollen taken from the anthers of the shorter stamens.

As numerous irregular flowers have stamens of different lengths, this experience opens out a new field for experiments with Labiatae, Scrophularineae, Leguminosae, &c.

M. Verlot observes that when plants are cut back early to make dwarf plants of them, though it may usually only affect the individual plant, yet he thinks that if it be habitually submitted to this treatment, the seeds are subsequently more likely to give rise to dwarf plants.

As an illustration, the writer has lately had occasion to notice a tennis lawn, part of which was returfed from a field last winter. The whole has been left to grow uncut. The result is that while the new turf rapidly grew tall, as it would have done in the field if left for hay, the old lawn-turf and other flowering plants mixed with the grass have remained more or less in a much dwarfer condition.

Similarly, Mr. Veitch found that cuttings from the miniature trees made by the Japanese and struck in a border refuse to grow. If, however, they be grafted on other and vigorous plants of the same kind, they then grow out vigorously. It would be interesting to see if seeds of such tiny trees produce dwarfs also.

It would seem, therefore, probable that whatever causes tend to check growth, *if persisted in long enough*, may in time have an hereditary effect.

It would be therefore advisable to try experiments besides the repeated pricking out alluded to :—(1) Reducing the roots; (2) reducing the foliage; (3) cutting off the terminal shoots; (4) selecting small seeds; (5) crossing with pollen from the smaller stamens, wherever there is an inequality; (6) using pollen from the smallest flowers on the plant; (7) poor soil.

Double Flowers.—These result from various alterations in the structure of flowers, coupled with an increase in the number of petals. The question is, what are the causes which induce the production of double flowers? M. Verlot observes: "A rich soil, a culture inducing a luxuriant vegetation, are those under the influence of which we see duplication generally to arise in our gardens."

On the other hand, Mr. Barron observed that: "Double flowers growing on a sandy soil at Sutton keep truer to doubling than on a wet, heavier soil at Chiswick." Mr. Wolley Dod

corroborates this fact, for he says that his own cold and wet soil tends to make his double daffodils to become single.

Mr. Darwin, some fifty-five years ago, noticed and described, in the *Gardeners' Chronicle* (1843, p. 628), some double flowered *Gentiana Amarella*, "which grew on a very hard, dry, bare, chalk bank." Similarly he found on an adjoining field of "wretchedly sterile clay great numbers of *Ranunculus repens*, producing half-double flowers." He then asks the question, "Is it, then, too bold a theory to suppose that all double flowers are first rendered, by some change in their natural condition, to a certain degree sterile?" When a double-flowering plant has this affection well fixed in its constitution, then it would seem that it is benefited by a rich soil; "petalody" having set in, it may affect every part of the flower—stamens first, then pistil or calyx, and finally the petals may be multiplied indefinitely, so that a flower of the double stock may contain more than fifty petals.

That the petalody can be "in the blood," so to say, is seen from the fact that, as no seed can be raised from a "perfectly" double stock, they can be procured from the "single" flowers. For by suppressing the anthers of flowers before they shed their pollen, the seeds (M. Verlot observes) developed in the ovaries of these flowers produce double-flowering plants with great facility—viz. 60 to 70 per cent. If the anthers be not removed, then the percentage drops to 20 to 30 of double-flowering offspring, the number of seed being reduced to five or six in a pod, which produced double-flowering plants, instead of from forty to fifty.

As another influence, that of age may be mentioned. Thus, seed of *Matthiola annua*, sown immediately after being gathered, produced few double-flowering plants; while seed three to four years old produced many. Wallflowers gave similar results.

Yet another fact may be mentioned which bears out the same contention. It is found that old, strong root-stocks of Dahlias produce strong growing plants, but they do not "double" well. Heavy foliage and rich colouring are, as a rule, adverse to doubling.

The conclusion to be drawn from the above facts is that it is not a rich soil which first induces doubling, but a poor one; but

let the doubling be once thoroughly set up in the plant's constitution, and it then seems that a rich soil will probably enhance it.

As soon as the slightest indication of petalody of the stamens has appeared, by one or more of them having a minute petal-like appendage; then that particular flower in which the change has occurred must be fertilised with its own pollen, all other pollen being rigidly excluded. The progeny will, in all probability, prove to be semi- or quite double. Such was the experience with Mr. Heal, who raised the *Balsamæ-flora* section of the East Indian Greenhouse *Rhododendrons* in this manner.

I will conclude by quoting a passage from Bacon's "Natural History," Century vi. § 513. "It is a *curiosity* also to make *Flowers double*, Which is effected by *Often Removing* them into *New Earth*; As on the contrary Part, *Double Flowers*, by neglecting, and not Remouing, prone *Single*. And the Way to doe it speedily, is to sow or set *Seeds*, or *Slips* of *Flowers*; and as soone as they come vp, to remoue them into *New Ground*, that is good."

ON THE ECONOMIC USES OF BAMBOOS.

By MR. A. B. FREEMAN MITFORD, C.B., F.R.H.S., F.L.S.

[Read July 26, 1898.]

THERE is an old Chinese proverb which says, "Better meals without meat than a house without a Bamboo." To our western ears, accustomed as we are to the shy and lagging growth upon which alone the Bamboos venture in a climate that shows them but poor favour, such a saying may seem to smack of extravagance. How can these puny rods, so tender in their birth that a breath of the summer wind, or the weight of a perching wren, will snap them in sunder, play any foremost part in the great struggle for life? But those who go down to the sea in ships and do business in great waters, having seen these grasses at home in all their lusty pride, and having noted the thousand and one ways in which they are made to do service, will perforce own that there is some reason in the proverb, and that, at any rate, there is not among the kindly fruits of the earth a plant more intimately bound up with the life of man. Consider for a moment the matter of size, and size only. Exalted almost

above all the trees of the field in its own country is the Burmese Bamboo (*Dendrocalamus giganteus*). It is worth the trouble of a voyage to Ceylon to see the beauty of the Peradeniya Gardens, near Kandy. But in that Paradise, where all the treasures and wonders of the tropical flower-world are gathered together in wildest wealth of colour and form, nothing is more striking than this huge Bamboo. Picture to yourself great clumps of a hundred or more canes, from 20 to 30 inches round and 135 feet high, spurning the earth in their heavenward flight, and bending their graceful heads on all sides, like great showers of sky-rockets hurtled into mid-air! Such figures as these sound like drawing the long bow, yet are they sober truths, grounded upon official measurements given me by the Director of the Gardens. Here, by way of proof, is a piece of one of these culms, by no means chosen as one of the greatest, but taken at haphazard, 27 inches round, which, from its size and structure, will at once suggest some of the many necessities to which the ingenuity of man may apply such a plant. At the same time I must point out to you that, looked at from the point of view of usefulness, this Burmese giant, beautiful as it is, takes no very high place amongst its kin. It is, as you can see, very hollow, the walls being a mere shell in proportion to the height and girth of the culm—the fibre of the wood is loose and spongy, it dries quickly and is then apt to splinter, but when used as a water-pipe and so kept moist it lasts well. The specimen now before you has been soaked in linseed oil in order to preserve it; the quartermaster on board ship who did this for me, told me that it sucked up the oil almost as fast as he could pour it in. He was quite amazed at the amount of oil which it drank in. I must say that I was rather astonished during a visit which I paid to Ceylon last winter to find that the only Bamboos which have been planted there to any great extent are this *Dendrocalamus giganteus* and the very inferior native Una (*Bambusa vulgaris*), which is even more shelly and more easily split. Here you see a fair specimen of its quality. A child might almost crush it in its little hand. And yet the value of the tribe is fully recognised. Seeing that on almost all the tea estates which I visited Bamboos were growing, I asked the Chairman of the Ceylon Planters' Association whether they were cultivated for use or for ornament. His answer was to the point: "For use. I had not the least idea of the many uses of

Bamboos until I planted them myself." In a climate where Bamboos simply grow for the asking, I should have expected to find the best, the toughest, and the most valuable species introduced from China and elsewhere. The pity of it is that time and money, that might have been better spent, should have been lost.

I am rather anticipating ; but what I have said will serve to show how little attention has been paid even by some of the best of our colonists to a genus which I shall have little difficulty in proving to be a possible source of great profit where the conditions are favourable to its culture.

There is one plant, the Cocoanut Palm, which disputes with the Bamboo the honour of being the best friend of mankind. This tree, according to the pretty Singhalese fable, pines if it be out of reach of the sound of man's voice, and dies if the village, near which it has thriven, be deserted.* Unless you walk under it and talk under it, it will not flourish. This intense philanthropy is probably accounted for by the fact that the plant requires careful tending and manuring, which it cannot get in the jungle. Be that as it may, there is no doubt that its uses are almost endless. The trunk, the leaves, the blossom, the sap, the nut and its juices, the shell and the fibre which surrounds it—all are turned to account ; and Percival cites the case of a ship which, some forty years ago or more, came from the Maldive Islands to Galle, " which was entirely built, rigged, provisioned, and laden with the produce of the Cocoanut Palm."† But I do not hold a brief to-day for the Cocoanut Palm. I am retained on the other side, and I trust to bring forward such evidence as will ensure an unanimous verdict in favour of my client. There is nothing which the Palm has done for the well-being of man which the Bamboo has not done, and more besides. Indeed, great as may be the merits of this powerful rival, it is open to one blame from which it cannot escape. No more poisonous spirit has been invented to steal away the brains of man than arrack, which is distilled from the sap of the flower-buds of the cocoanut. No such crime can be laid to the charge of the Bamboo, the gifts of which are all good without a single exception. It must be confessed that here we score a point, though it be one of negation.

* Sir Emerson Tennent's *Ceylon*, vol. i. p. 119.

† *Ibid.* vol. ii. p. 109.

Of far greater import is the connection of the Bamboo with letters. The "Ch'u shu chi nien," or, Annals of the Bamboo books, is an historical classic of an authenticity which has never been doubted, and which was discovered more than 1,600 years ago, graven in the old seal character upon bamboo tablets. And in this connection it is amusing to see that only a few weeks ago the Corean Government, wishing to record for all ages their sense of gratitude to Mr. McLeavy Brown, the able financier whose name has been recently so much before the public on account of the Russian intrigue to oust him from his post, enacted that his great deeds should be "written on silk and graven upon Bamboo Tablets." The Cocanot Palm can show no such connection with letters and politics. If it wishes to save the family honour in this respect, it must call in its cousin the Talipot Palm (*Corypha umbraculifera*), though it would be difficult to argue that the writings of the Buddhist monks, the highest use to which its leaves have been applied, could compare with the importance of the "Annals of the Bamboo Books."

As regards geographical distribution it may be said briefly that Europe is the only quarter of the globe in which Bamboos are not found. In Asia, America, Africa, and Australasia, in fact in all tropical and subtropical climates, they are indigenous. Probably there are more species in Asia and in South America than in any other part of the world. I say probably, because of the African genera and species little information has, up to the present, been available. They affect the most various situations. The home of some families is among the steaming swamps of Siam and the Malay Archipelago; others thrive at high altitudes on the snow-clad Himalayas. One species, *Chusquea aristata*, "first makes its appearance at a height of 13,000 feet above sea-level on the eastern chain of the Andes in irregular patches; at 15,000 feet (the height of Mont Blanc), it completely covers the whole surface, forming what the natives call a *carizal*, impenetrable to man or beast. It continues nearly to the limits of perpetual snow" [Jameson, quoted by General Munro, p. 61 of his Monograph on the "Bambuseæ"]. It not unfrequently happens that one and the same species is found in widely differing conditions as to climate, rainfall, and soil, and, not unnaturally, so changed in character and appearance as to puzzle the very elect, and completely bewilder the

profane. Take for instance *Dendrocalamus strictus*, the famous so-called male Bamboo of India. It is found, as we are told in Mr. Gamble's exhaustive monograph on the "Bamboos of British India," on dry hill slopes in the Siwaliks, on the rocky hills of Central India and the Deccan; it is also found in Burmah, in Bengal, and in moist localities in Southern India. In the former case, where the soil is dry, the culms are small, very hard, and solid, or nearly so; in the latter case, where there is much moisture, the culms increase in size, and are hollow. The sheaths, leaves, and even the flower spikelets show corresponding variations. In damp Ceylon, where the species is not indigenous, but is grown in the Botanic Gardens, I was unable to find a record of a single solid culm ever having been observed. But even in the most favourable circumstances it is not every culm in any one plant that will be sufficiently solid to furnish a spear-shaft; some will always be more hollow than others—and this inconsistency vexes the souls of our military officials at the War Office and in the Government of India. Spear-shafts are needed: how is it that every culm will not furnish one? There must be something rotten in the state of our forestry; and so our foresters are reviled because Bamboos will follow the laws of Nature rather than the commands of gentlemen in cocked hats.

But wherever they may be found, in whatever quarter of the globe, in whatever conditions, in whatever variations, to man the Bamboos have been an inestimable gift. The Chinaman, probably, may lay claim to the credit of having turned that gift to the most profitable account; and, indeed, he is fully alive to his indebtedness. *Tz'u Chün*, "this gentleman," is a common classical name for the Bamboo; it is taken from a verse of the poet, Wang Hui Chih, who exclaims, "How can I exist for a single day without this gentleman?" Nor is this the language of exaggeration. Just think what the Bamboo means to the Chinaman. It carried his mother as a bride to her husband's house; it will carry himself to his grave. In the meantime it will have built and furnished a house for him.* The cost of the materials of the house is estimated by Dr. Wells Williams at \$5. It will have supplied him with several articles of food and one of medicine (the famous tabashir); with clothing, with paper

* Dr. Wells Williams, *Middle Kingdom*, vol. i. p. 360.

and pens, with arms, with fishing-tackle, with masts, sails, and ropes for his boat, sometimes with the boat itself. It will have furnished him with nearly all the implements of his daily toil in the fields, and soothed his evening leisure with melody, for the Bamboo is specially, as Shelley said of the guitar, "the slave of music." Is he an artist? Here is his model and the brush wherewith to paint its grace. Many a time during my wanderings far away in the interior of China I have rested in some little wayside inn, the walls of which have been decorated by wandering painters, each paying his shot with his skill, and more often than not the subject has been a dainty study of Bamboo, with perhaps just the suggestion of rock and river. To the four hundred millions of Chinamen, rich and poor alike, this is a living thought: "How can I exist for a single day without this gentleman?"

In India it has been recorded how, over and over again, the seeding of the Bamboos has stood between the natives and death from starvation; while the ingenious ways in which the plants are turned to account for the most various purposes has aroused the admiration of travellers, and notably of that most distinguished man, Sir Joseph Hooker, who alludes to them more than once in his Himalayan journals. A few weeks ago I fell in with one of our great Indian officials, who told me of a property in Bamboos which was new to me. He was on duty on the north-east frontier of India. It was a dry and thirsty land, and what scanty supplies of water were to be found were impure and poisonous. Luckily there was a great Bamboo growing there, 20 inches in circumference, of which the Ghoorkas tapped the internodes with their knives, drawing from each joint about a teacupful of deliciously pure wholesome water. The kindly plant had sucked it up foul from the soil, and literally filtered it. My friend could not give me the name of the species, nor have I been able to ascertain it. I could not help thinking it somewhat ungrateful not even to have asked the name of so good a friend.

Even the most savage and primitive races make the Bamboo serve the wants of their simple lives. It furnishes weapons for war and hunting, traps, tackle for fishing, and other obvious and simple implements. The blow-pipes from which the Jacoons, or Tree-men of the Malay Archipelago, shoot out poisoned

arrows with such deadly aim that they can even kill tigers with them, are a good example of such weapons. So are the assegais of the Dasutos, the shafts of which are made from culms of *Arundinaria tessellata*. It is said that some Malayan tribes use the bristles which are found on the sheaths of certain species as a means of poisoning their enemies. The bristles are mixed with curry, and escape observation; they stick in the victim's throat, violent irritation and inflammation are set up, and, finally, death ensues. This, however, hardly comes under the category of the economic uses of Bamboos. The great debt which European commerce owes to the Bamboo must never be forgotten; it was in canes of Bamboo that two Persian monks smuggled the first Chinese silkworms' eggs to Constantinople for the Emperor Justinian in the sixth century.

I would willingly have dwelt longer upon this branch of the question, but I have already had my say upon it elsewhere,* and you have a wholesome rule that the papers which you honour by accepting shall break new ground. I propose therefore to give you some account of the uses to which those Bamboos which have been exhibited here to-day are put in their own country.

I will begin with the five Indian species:—

Arundinaria racemosa furnishes food for cattle and horses; it is used for making mats, for roofing native houses, for fences, and other purposes.

Arundinaria falcata makes Hookah tubes, fishing-rods, and basket-work.

Arundinaria spathiflora and *Arundinaria aristata* (Fig. 63) are made into baskets, pipe-stems, pea-sticks, &c.

Arundinaria Falconeri. Of the uses which this species serves I find no account. They probably do not differ from those of its congeners.

We now come to the (from an economical point of view) far more interesting species of China and Japan.

The foremost of these is *Phyllostachys mitis*, a truly glorious Bamboo, which, in its own country, grows to a height of from 60 to 70 feet, with a girth in proportion. In the gardens of the Château Eléonore, at Cannes, there is a clump of which the canes measure 35 feet, and are 12 inches round. The walls of

* See R.H.S. Journal, Vol. XIX. p. 359 et seq.

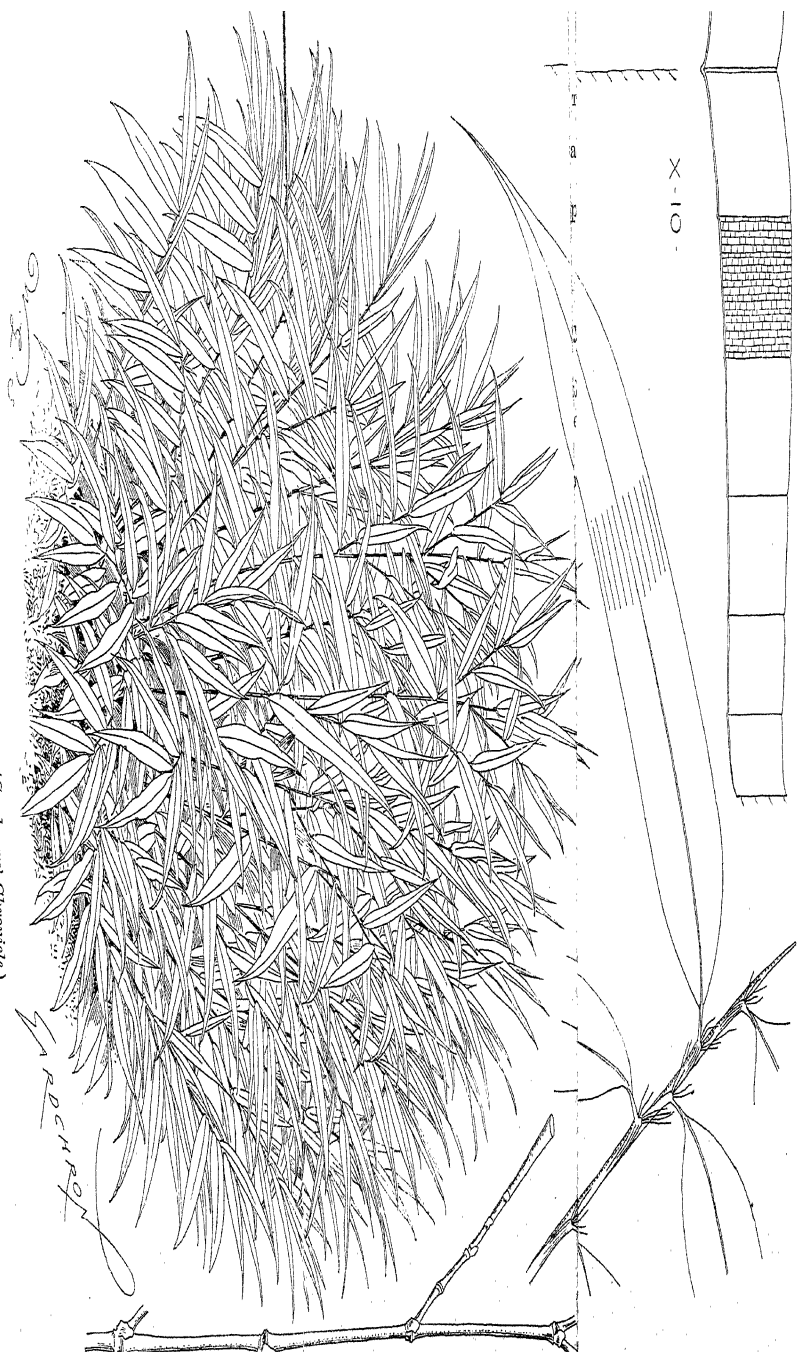
the culm are rather thin, but, on the other hand, the wood is very tough and light, so that there is hardly any use to which timber can be put that this Bamboo does not serve. It is largely used for building purposes, scaffolding, the frame of the house, water-pipes, furniture, and carved ornaments; for boats and junks it is in constant request; and it is the young shoots of *P. mitis* which are so highly prized by the Japanese as a vegetable food. It is not indigenous in Japan, but was introduced, according to the author of the "Nippon Chiku Fu" (catalogue of the Bamboos of Japan), about the year 1738 A.D. It was carried from China to the Liukiu Islands, and thence to the Province of Satsuma, whose princes claimed sovereignty over those islands. The name Môsô is, as Mr. Van der Polder ("de Cultur der Bamboe in Japan," p. 11) suggests, probably that of the importer, who certainly, as a lasting benefactor to his country, deserved to have his fame so perpetuated.

It would be tedious to go through these various species one by one; it must suffice to say that all the larger *Phyllostachys*, such as *P. Quiloi*, *P. Marliacea*, *P. Henonis*, *P. Boryana*, and others, are used much in the same way as *Phyllostachys mitis*, though they can hardly be said to compete with it. *Arundinaria japonica* (Métaké) is also employed in the same way, and its far-spreading rhizomes render it invaluable for strengthening dykes and holding together embankments. For this latter purpose some of the semi-dwarf and dwarf Bamboos, such as *Bambusa* or *Arundinaria palmata*, *Arundinaria Veitchii*, *B. pygmæa*, and others, are most useful, their roots making a perfect network underground, and spreading with phenomenal rapidity.

One of the most prominent Bamboos as an article of commerce is certainly *Phyllostachys nigra*. It is largely used for decorative purposes in building, and much of the Bamboo furniture which is imported into Europe, and now so largely sold, is made either of *Nigra* or the variety of *Nigra* known as *nigro-punctata*. Walking-sticks and umbrella handles are made of it, and its rhizome furnishes the cane known as Wanghai.

Phyllostachys Castillonis is evidently a garden sport, not improbably of *P. Quiloi*, to which in form and manner of growth it bears a strong likeness. It is only valued as a

FIG. 64.—*PHYLIOSIACHNE EULIA*. (*clavdens* *Chironide*.)



garden ornament. I am strongly inclined to think that both *P. Castillonis* and *P. rugosa* or *Marliacea* are garden forms of *P. Quilkoï*.

Phyllostachys heterocycla, the tortoiseshell Bamboo, I take to be simply a deformity of *Phyllostachys mitis*, caused by the repressive action of stiff soil, which forces the growing internodes in a soft state back upon themselves from side to side, until they reach freedom in the open air, when the remainder of the culm resumes its natural aspect. The same deformity may be observed in similar circumstances in the case of *Phyllostachys aurea*. I found it myself in plants of *P. aurea* growing in very stiff soil at Grasse, on the Riviera. I have not seen it or heard of it in any other species. The more slender stems of *P. aurea*, when they present this appearance, are valued as walking sticks, umbrella handles, and for other trifles. Their quaintness gives them the charm of curiosity. If you will take the trouble to look at these two specimens, *P. heterocycla* and *P. aurea*, showing the same tortoiseshell-like armour, I think my meaning will be plain to you. I may here say that the so-called tortoiseshell Bamboo of commerce is not *P. heterocycla*, but a cane of any bamboo artificially coloured by burning.

Bambusa quadrangularis is used for walking sticks and umbrella handles, and for the manufacture of fancy articles, pipe-stems, &c. It is almost certainly not indigenous in Japan, but introduced from China through the Liukiu Islands. Dr. MacGowan, writing to "Nature" February 8, 1886, says: "It grows wild in the north-eastern portion of Yunnan, on the sequestered mountains of Takuan Ting and Chên Hsing Chou, to which in spring men, women, and children resort for cutting its shoots, which they tie in bundles and send to market. It is prized above all other bamboo shoots as an esculent" ("Nature," xxxiii. 1886, p. 560). There is a most interesting account of this species published by Mr. Thiselton Dyer in "Nature" xxxii. 1885, p. 391, from which I take the following quotation from a communication of Dr. MacGowan. "Its anomalousness is attributed by the Chinese to supernatural powers—occult agencies varying with each district. The Ning-po *Gazetteer* tells how Ko Kung, the most famous of alchemists, fourth century A.D., thrust his chopsticks, slender bamboo rods pared square, into the ground of the spiritual monastery near that city, which, by thaumaturgical

art, he caused to take root, and to appear as a new variety of bamboo—square.”

The smaller species of Bamboos are made into musical instruments, fans, pipe-stems, and a hundred other toys and fanciful trifles. If anybody wishes to see what wonders may be accomplished with all the bamboos, he has but to visit the collection presented by Mr. Holmes to the museum at Kew, where his curiosity will be amply satisfied. There is also, in the “Transactions of the Japan Society,” a very interesting article, beautifully illustrated, in which the same gentleman describes the collection.

I may perhaps be allowed here to call your attention to two bamboos which are exhibited here to-day for the first time—*Phyllostachys fulva* and *Arundinaria metallica*. The former is a Japanese species which grows in Satsuma, in the Liukiu Islands, in the Province of Awa, and in other places. The native name ôgon signifies yellow gold, and as the name *aurea* was already appropriated, I took *fulva*, Virgil’s epithet for gold, as the nearest approach to it. I am always anxious, if possible, to preserve something of the native nomenclature. The yellow colour in the stems is said not to show before the plant has attained maturity. (Fig. 64.)

Arundinaria metallica is quite one of the best, if not the best, of the dwarf species, in some respects resembling *Arundinaria Veitchii*, but apparently even more vigorous, and not sharing with it the defect of leaf edges which wither in winter. It is found in the Kanéyama or mine mountains in the province of Osumi; hence it takes its native name Kanéyama-daké, which I, acting on the principle which I have just stated, have translated *Arundinaria metallica*, from μέταλλον, a mine. It is also found in the Island of Yezo, on the Shakotan Mountains, and is locally known as Shakotan-chiku. (Fig. 65.)

I have every reason to believe that both these species will prove hardy and valuable additions to our gardens. *Arundinaria metallica*, I should observe, shows every sign of being even a stronger runner, if that be possible, than *Arundinaria Veitchii*, but both are great travellers and will make a famous undergrowth for game coverts.

We have now to consider the Bamboo as breadwinner. That we, in this uncertain climate, shall ever be able to grow Bamboos

as a profit-bearing crop upon the land, seems to me in the highest degree improbable; our sun is not strong enough to ripen the wood for practical purposes, and moreover we labour under one notable disadvantage which must always be against our producing culms of any size; in their own home the hot season is identical with the rainy season, and it is this combination of heat and moisture which gives the plants their marvellous development; whereas in this country such warmth as is vouchsafed to us comes with the dry season. We entirely lack that steamy atmosphere which is the secret of tropical vegetation. If anywhere, it will be in Cornwall and in parts of Ireland, that a success may be scored, but even in the most favoured localities the experiment will be costly, and the result slow of attainment, as I shall show you presently. Besides, even if we could reach the highest conceivable success, there would not be the same demand for our canes as there is in China or Japan; we should not put bamboos to a tithe of the uses which they serve in those countries. Who, in this climate, would care to live in a Bamboo hut? What fisherman would put to sea in a Bamboo-rigged junk?

In some of our colonies the case is different. I spoke to you just now of the Bamboos which are being grown in Ceylon. In that island, where wood is much needed, so much of the primeval jungle having been cleared to make way first for coffee, then for cinchona, and lastly for tea, I have every faith that such valuable Bamboos as *Phyllostachys mitis*, *P. nigra*, and *Arundinaria japonica* (Métaké) might be grown with great profit, displacing those inferior species which are now planted. In their East Indian possessions the Dutch are setting us a good example in this respect. Probably their long connection with Japan has made them sensible of the great economic value of the Chinese and Japanese Bamboos. A member of their Legation in Japan, Mr. Van de Polder, has made a digest of the native treatise on these plants, which has been officially published by the colonial museum at Haarlem; and two years ago the director of that museum, who evidently takes the deepest interest in the subject, wrote to me for further information as to the scientific nomenclature of species of which only the Japanese names were given. There must be many places in our possessions where the

authorities might with advantage take a leaf out of the Dutchmen's book.

I have not been able to obtain much information as regards the cost of planting bamboos in their own country for commercial purposes, nor as to the profits to be obtained. Of course there must in any case be a number of years, varying, according to Chinese authorities, from seven to ten, before the plants come to maturity, but once they have attained a size at which their canes may be cut for sale, the crop must bring in a goodly revenue. We are told that in the village of Lower Uchimamura, near Tokio, an enterprising individual has planted a plot of land of about two acres in extent, having a sandy, stony soil, so poor that hardly anything would grow on it, with the black bamboo, *Phyllostachys nigra*, with the result that he sells every year five hundred dollars' worth of walking sticks and umbrella canes.*

That the industry is a paying one is proved by the great care with which the best species are cultivated both in China and Japan. No people make more of their land than the Chinese and Japanese, and they would not waste thousands of acres upon an unprofitable crop.

I am not aware that any very extensive plantations of bamboos, as a commercial speculation, have been attempted in Europe. But my information is lamentably far off from being up to date. The newest source at my disposal is twenty years old, being a "Note on the Cultivation of the Bamboo and its Industrial Uses," by M. A. Calvet, published by the French Department of Agriculture and Trade, in 1878.

He says, "The introduction of the bamboo into the South-West (of France) is due to M. Guillemin, the owner and director of the farming school at Tolou, near Gau, in the Lower Pyrenees; it dates from the year 1861. The first plants came from the garden of the Hamma, at Algiers.

"Since then, M. Garrigues, the assistant director of the farm, has extended the cultivation of the bamboo in the valley of the Néez, at the mouth of the valley of Ossau, with the greatest success.

"An area of four hectares, on a slope at a height of 350

* Van de Polder.

metres, is now in full production under bamboos, and the gardening operations carried on every year in the thicket formed by the culms give magnificent results.

"In the present condition of the bamboo trade" (remember that we are speaking of the year 1878) "the net annual profit on M. Garrigues' farms varies from eight hundred to a thousand francs per hectare" (from sixteen to twenty pounds an acre—the hectare being, roughly, two acres).

M. Calvet goes on to point out the value of the bamboo as a forest plant, and especially for fixing embankments and sloping ground. He states that it takes from seven to eight years to make a plantation, which is then composed of culms of all sizes and ages, very closely packed, and the thinning out begins with the oldest shoots, and is thenceforth carried on without interruption. He reckons the cost of planting one hectare (two acres) with bamboos at 3,000 francs (£120). He insists upon the necessity of a light friable soil. The culms take from 45 to 65 days to develop themselves, beginning in the month of May. They vary in height from three to nine metres, with a diameter of from one to seven centimetres.

The species which M. Garrigues has selected for cultivation are *Phyllostachys nigra*, *Phyllostachys mitis*, and *Arundinaria japonica* or Métaké.

Phyllostachys nigra is used for walking sticks, umbrella handles, sword sticks, whip handles, fishing rods, furniture, &c.

P. mitis, in addition to the above, is made into cups, napkin rings, egg-cups, ox-goats, poles for beating walnut and chestnut trees.

The small canes of Métaké, curiously enough, are known in both French and English commerce, &c., as "Rice," and are used for pipe-stems, cigarette and cigar tubes, pen and pencil holders, garden stakes, &c., &c.

Apart from the bamboos grown in France, there was an average annual importation during the five years from 1871 to 1875 inclusive, amounting in value to £86,000 a year. M. Garrigues' experiments go to show that this value might be produced by the cultivation of about 500 hectares (1,000 acres).

The prices which M. Garrigues' canes command in commerce are as follows :—

	francs	cts.	
Bundles of bamboos in the rough, for whip handles, without roots ...	50·00		per hundred.
Do. prepared for whip handles, with roots	18·00		a dozen.
Bundles of bamboo whips, with roots	60·00		a dozen.
Do. do. without do.	48·00		a dozen.
Fishing rods, with the terminal point	0·050		per metre.
Tops for fishing rods, according to the length	30-50		per hundred.
Bundles of bamboos, for umbrella work, in the rough	10		per hundred.
Bundles of bamboos, for umbrella work, prepared	30		per hundred.
Bundles of bamboos with roots, prepared	100		per hundred.
Alpenstocks, without roots	18		a dozen.
Do. with roots	24		a dozen.
Ox-goads, mounted with spring prick	12-15		a dozen.
Long sticks, for removing caterpillars from trees	0·25		per metre.
Extinguishers for churches	0·25		per metre.
Do. do. gas burners	0·30		per metre.
Corner sticks, for rooms and frames	0·25		per metre.
Goblets and cups	3·00		a dozen.
Napkin rings	1·50		a dozen.
Egg-cups	1·50		a dozen.
Paper cutters	3·00		a dozen.
Shoe-horns	3·00		a dozen.
Tobacco-pipes of bamboo roots ...	3 to 10	fr.	each.
Paper made of sheaths and leaves of bamboos			no price given.
Ink-horns	3·00		a dozen.
Penholders, in the rough	2·00		a hundred.
Bamboo sheaths, for paper making...			no price given.
Canes called "Java," made of Rhizomes	}	Prices varying from two to five guineas each.	
Canes called "queues de mulet," mules' tails, made of those underground rhizomes which are continued above ground as oblique culms			

Such were the prices realised by this French industry twenty years ago. The great development of steam communication may have made great changes since then. I have made every attempt to get further and more accurate information, but for some reason best known to themselves the French will not give

it. For us it has only an academic interest ; our climate forbids any competition. Indeed, from inquiries which I have made it would appear that even the best Europe-grown Bamboos are rejected by our artisans ; only those canes which have been ripened and toughened by the burning sun, and nourished by the torrential rains of the Far East, will serve their purpose.

If statistics as to the Bamboo commerce in France are withheld, in England they may be said to be non-existent. In the Board of Trade Returns Bamboos are lumped together with canes and rattans in such a way as to render it impossible to obtain any accurate general information. I have undertaken a voyage of discovery into the depths of the Borough without much result. The Bamboo importers, though most courteous and ready to supply any information at their command, can of course only speak each one as to his own particular business. Indeed, some of the statements made to me were contradictory ; for instance, one great dealer assured me that Bamboos only come over as ballast and are sold by public auction ; another pooh-poohed this, and showed me his bills of lading, proving that he had paid 9*d.* per foot cube on his importations. I will not weary you with the difficulties and disappointments by which I was met in my endeavours to give you some account of the Bamboo trade. Suffice it to say that the latest edition of the Post Office Directory shows that there are now in London alone no fewer than six firms of Bamboo importers ; probably there are others at the seaports. There are also in London six firms of Bamboo cane-workers, and thirty of Bamboo furniture makers. A business giving employment to such numbers of people seems to me to deserve some notice. I hope that before long our very active Department of Trade will see the advisability of getting together reliable statistics in regard to a branch of commerce which is not unlikely to be of considerable and growing importance. At present China and Japan are the only source of supply of the Bamboos which our traders require. For the Indian species, with the exception of *Dendrocalamus strictus* which our warriors require, there is no demand. The war between China and Japan sent up the prices of Bamboos some 30 or 40 per cent. Why should not some of our Colonies possessing the requisite soil and climate enter into competition with those astute Easterns ?

I am afraid that in thus briefly discussing this branch of the subject which I have brought before you, I have had very little information to convey. All I can say is that it has not been for the want of trying that I have failed. I must console myself with the saying that "in the kingdom of the blind the one-eyed man is king." If the fare be meagre, it is the best that I can offer. At any rate, admiring and loving the Bamboo as I do, I hope that the exhibits which you have seen here to-day may send some of you home to your gardens having caught the infection of enthusiasm for their beauty, and perhaps giving practical expression to the Chinese poet's saying, "How can I exist for a single day without this gentleman?"

LIST of the HARDY BAMBOOS shown by A. B. Freeman Mitford, Esq., C.B., to illustrate the above paper, and for which a Gold Medal was awarded by the Council :—

1. *Arundinaria anceps* (Mitford). Origin uncertain.
2. *Arundinaria aristata* (Gamble). North-Eastern Himalaya.
3. *Arundinaria auricoma* (Mitford). Japan.
syn. *A. Fortunei* var. *aurea* (Hort.).
Bambusa Fortunei var. *aurea* (Hort.).
B. Maximowiczii (Hort., in part).
4. *Arundinaria chrysantha* (Mitford). Japan.
syn. *Bambusa chrysantha* (Hort.).
5. *Arundinaria Falconeri* (Mitford). Himalaya.
syn. *Thamnocalamus Falconeri* (Hook. F.).
6. *Arundinaria falcata* (Nees). Himalaya.
syn. *Bambusa falcata* (Hort.).
B. gracilis (Hort., in part).
7. *Arundinaria Fortunei* (A. and C. Rivière). Japan.
syn. *B. Fortunei* (Van Houtte).
B. Fortunei variegata (Hort., in part).
8. *Arundinaria Hindsii* (Munro). Japan.
syn. *Bambusa erecta* (Hort.).
B. gracilis (Hort.).
9. *Arundinaria Hindsii* var. *graminea*. Bean.
syn. *Bambusa graminea* (Hort.).
10. *Arundinaria humilis* (Mitford). Japan.
syn. *Arundinaria Fortunei viridis* (Hort.).
Bambusa gracilis (Hort., in part).

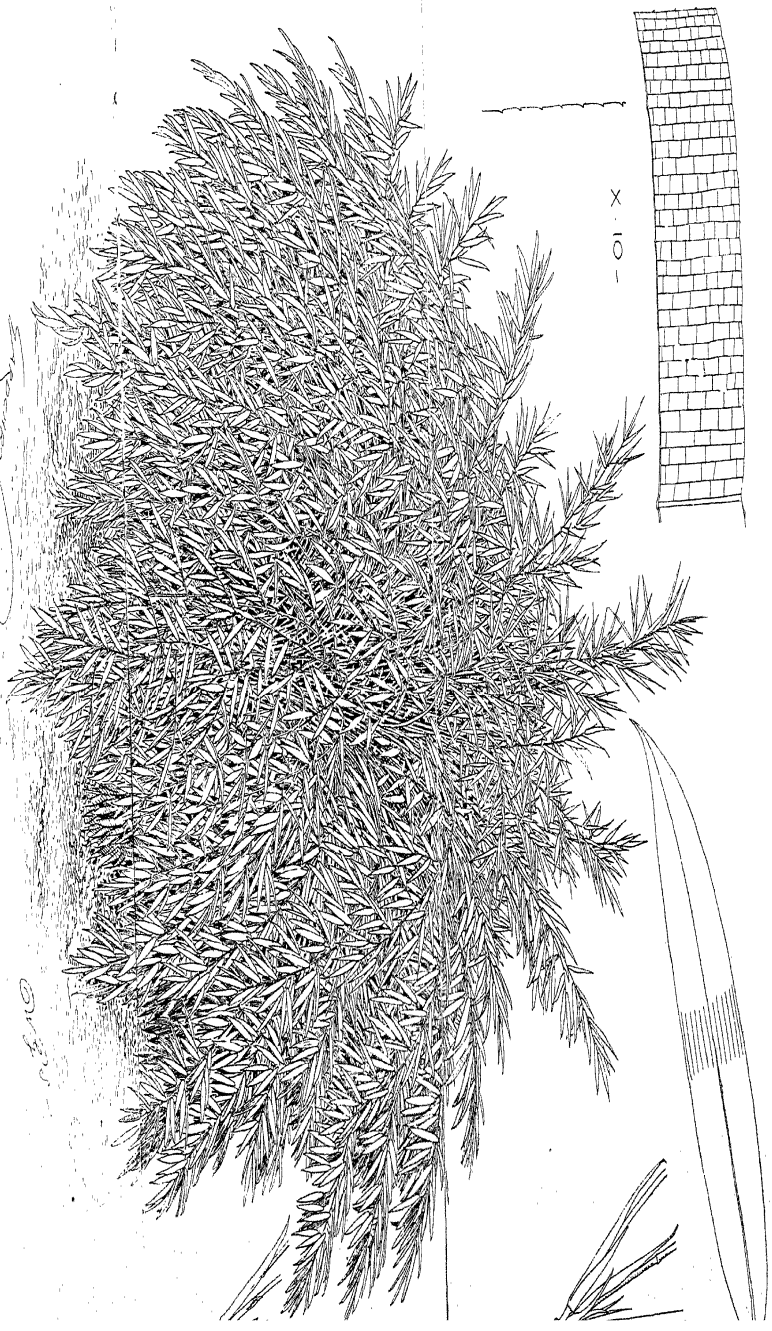


FIG. 67.—*ARUNDINARIA SETIDA*. (Gardner's *Chronicle*.)

11. *Arundinaria Japonica* (Siebold and Zucc.). Japan.
syn. *Bambusa Métaké* (Sieb.).
Phyllostachys bambusoides (Hort., not Sieb. and Zucc.).
12. *Arundinaria Laydekeri* (Hook. F., Mitford). Japan.
syn. *Bambusa Laydekeri* (Marliac). (Fig. 66.)
13. *Arundinaria macrosperma* (Michaux). U.S. of North America.
syn. *A. macrosperma* var. *suffruticosa*.
 " " var. *Tecta* (Gray).
Bambusa Hermannii (Hort.).
B. Neumannii (Hort.).
14. *Arundinaria metallica* (Mitford). Japan.
15. *Arundinaria nitida* (Mitford). Central China. (Fig. 67.)
syn. *A. Khasiana* (Hort., in error—not Munro).
16. *Arundinaria nobilis* (Mitford). Origin uncertain, probably Central China.

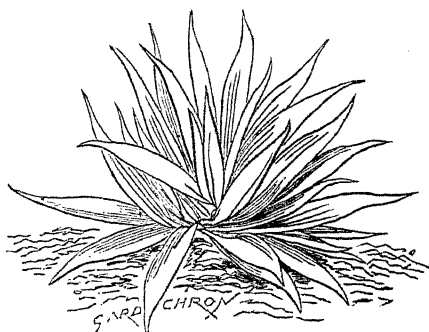


FIG. 66.—SEEDLING OF *ARUNDINARIA LAYDEKERI*. (*Gardeners' Chronicle*.)

17. *Arundinaria palmata* (Mitford). Japan.
syn. *Bambusa palmata* (Burbidge).
18. *Arundinaria pumila* (Mitford). Japan.
syn. *Bambusa pumila* (Hort.).
19. *Arundinaria pygmæa* (Mitford). Japan.
syn. *Bambusa pygmæa* (Miquel).
20. *Arundinaria racemosa*. Himalaya.
21. *Arundinaria Simoni* (A. and C. Rivière). China.
syn. *Bambusa Simoni* (Carr.).
B. viridistriata (Hort.).

- var. *variegata* (Hook. F.).
Bambusa albo-striata (Hort.).
 „ *Maximowiczii* (Hort., in part).
22. *Arundinaria spathiflora* (Trin.). Himalaya.
syn. Thamnocalamus spathiflorus (Munro).
23. *Arundinaria Veitchii* (N. E. Brown). Japan.
syn. Arundinaria Kurilensis var. *paniculata*
 (Schmidt).
Bambusa albo-marginata (Hort.).
B. Senanensis (Hort., not Frauchet & Savatier).
B. tessellata (Hort., not Munro).
B. Veitchii (Carr.).
24. *Bambusa angustifolia* (Mitford). Japan.
syn. B. Vilmorini (French Hort.).
25. *Bambusa disticha* (Mitford). Japan.
syn. B. nana (Hort., not Roxburgh).
26. *Bambusa marmorea* (Mitford). Japan.
27. *Bambusa Nagashima* (Marliac). Japan.
28. *Bambusa quadrangularis* (Fenzi). China. Probably
 not indigenous in Japan.
29. *Bambusa tessellata* (Munro). China, Japan.
syn. B. Ragamowski (Hort.).
30. *Phyllostachys aurea* (A. and C. Rivière). Japan.
syn. Bambusa aurea (Hort.).
B. sterilis (Hort.). Japan.
31. *Phyllostachys Boryana* (Mitford). Japan.
syn. Bambusa Boryana (Marliac).
32. *Phyllostachys Castillonis* (Mitford). Japan.
B. Castillonis (Carr.).
B. Castillonis (Marliac).
33. *Phyllostachys fastuosa* (Kew). Japan.
syn. Bambusa fastuosa (Marliac).
34. *Phyllostachys flexuosa* (A. and C. Rivière). North China.
syn. Bambusa flexuosa (Hort., not Munro).
35. *Phyllostachys fulva* (Mitford). Japan.
36. *Phyllostachys Henonis* (Mitford). Japan.
syn. Bambusa Henonis (Hort.).
37. *Phyllostachys heterocycla* (Mitford). Japan.
syn. Bambusa heterocycla (Carrière).

38. *Phyllostachys Marliacea* (Mitford). Japan.
syn. *Bambusa Marliacea* (Hort.).
39. *Phyllostachys mitis* (A. and C. Rivière). China, not
indigenous in Japan.
syn. *Bambusa mitis* (Hort., not Poir.).
40. *Phyllostachys nigra* (Munro). China. Japan.
syn. *Bambusa nigra* (Lodd.).
41. *Phyllostachys nigro-punctata* (Hort.). China. Japan.
syn. *P. nigra* var. *punctata* (Bean).
Bambusa nigro-punctata (Hort.).
42. *Phyllostachys Quiloi* (A. and C. Rivière). Japan.
syn. *Bambusa Mazeli* (Hort.).
B. Duquilioi (Hort.).
B. Quilioi (Hort.).
43. *Phyllostachys ruscifolia* (Kew). Japan.
syn. *P. Kumasaca* (Munro).
P. Kumasasa (Mitford).
Bambusa ruscifolia (Siebold).
B. viminalis (Hort.).
44. *Phyllostachys sulphurea* (A. and C. Rivière). Japan.
syn. *Bambusa sulphurea* (Hort.).
45. *Phyllostachys virescens* (A. and C. Rivière). Japan.
syn. *Bambusa virescens* (Hort.).
46. *Phyllostachys viridiglaucens* (A. and C. Rivière).
China.
syn. *Bambusa viridiglaucens* (Carrière).

SUMMARY.

Himalaya, five species :—

<i>Arundinaria aristata</i>.	|	<i>Arundinaria Falconeri</i> .
<i>Arundinaria falcata</i>.	|	<i>Arundinaria racemosa</i> .

Arundinaria spathiflora.

(N.B.—Of these *Arundinaria falcata* and *A. Falconeri* are
only hardy in the most favoured localities in the British Isles.)

United States of North America, one species :—

Arundinaria macrosperma.

China and Japan the remaining forty species.

HARDY HYBRID WATER-LILIES.

By Mons. R. LATOUR MARLIAC.

[August 9, 1898.]

IN order to keep within my subject, which is only to talk to you about the grand results obtained by crossing the native Water-lilies of the northern and temperate regions with those of the tropics (results which open up a new and beautiful method of decorating pieces of water), I shall refrain from giving a very detailed or complete history of the numerous original species of natural origin, which are sufficiently described in botanical works, more especially as these original species are destined, for the most part, to be relegated in the future to collections that are entirely scientific, and will disappear from ornamental collections, to which they will not be admitted on account of their manifest inferiority.

Several years at least have passed away since the lakes and pools of equatorial countries alone had the privilege of exhibiting a wonderful clothing of many-coloured Water-lilies, principally night-flowering—the charming and lesser stars of the waters, looked at only by the innumerable stars of the heavens which came out each night and bathed their sparkling light by the side of their elegant petals. Formerly all countries outside the tropics, and notably those of the European continent, only had for their share, as the principal objects of decoration in aquatic flowers, some few yellow Nuphars and white Nymphæas—very pretty, it is true, but too much alike to excite any violent rapture over their cultivation.

Amongst the number of typical Nymphæas I will only mention the following:—*N. alba*, indigenous to Europe; *N. pygmæa alba*, of Northern Asia; *N. odorata alba*, from North America; *N. odorata rosea*, also from America (the Cape Cod Water-lily), which being crossed one by one with those which originated in the tropics or thereabouts, such as the Indian *N. rubra* and its descendants, *N. devoniensis*, *N. Ortgiesiana rubra*, *N. flava*, from Florida; *N. mexicana*, from Mexico, &c., have become the foundation of the wonderful series of many-coloured hybrids which, whilst inheriting from their paternal side the

richest shades of colour, have been endowed by their female progenitors with a very hardy constitution; and these new comers, which often surpass in grace and beauty their most famous relatives from the torrid zone, have also the advantage of being day-flowering.

The number of hybrids which I have succeeded in raising at Temple-sur-Lot, where the cultivation of aquatic plants forms an important speciality, amounts exactly to thirty-four quite distinct varieties. The following are the names of those which are already known in the horticultural world: they are twenty-seven in number. The seven others are still unnamed, and have not yet been sent out; but before long they also will put in an appearance.

Andreana.—Flowers brick-red, shaded with yellow ochre; cup-shaped on a very straight stem, projecting 5 to 6 inches from the water; stamens rich orange; leaves spotted with chestnut-colour on the stalk and streaked with red-brown on the back.

Aurora.—One of the most remarkable varieties; ground-work of clear yellow, shaded with faint red the first day of flowering, with orange-red the second, and with intense red the third; stamens orange-red; leaves dark olive streaked with red-brown on the back.

Caroliniana nivea.—Flowers pure white, symmetrical, very large and double, with an exquisite scent; stamens rich yellow.

Caroliniana perfecta.—Flowers salmon-red, very double; petals obtuse and perfectly regular; stamens rich yellow.

Ellisiana.—Flowers bright currant-red. The fiery orange colour of the stamens has a very fine effect.

Fulva.—Flowers a very clear yellow shaded with red, which becomes brighter every day; petals incurved; stamens orange-red.

Gloriosa.—One of the triumphs of hybridisation. A grand floating scented flower, 7 inches in diameter, very double, and of perfect form; currant-red, washed with rose-white at the tips of the lower petals; stamens rich red. This is the only Water-lily which has regularly five sepals.

Laydekeri fulgens.—Another variety of the very first order. Flowers rich amaranth; stamens fire-red.

- Laydekeri lilacea*.—A charming flower, medium-sized, projecting 4 to 5 inches from the water; lilac tipped with carmine; stamens orange-red.
- Laydekeri purpurata*.—Flowers carmine-pink, crimson towards the centre; stamens orange-red.
- Laydekeri rosea*.—One of the most interesting varieties, and very floriferous; flowers medium-sized, passing successively from a tender pink colour to carmine-pink and then to rich carmine; stamens orange-red.
- Lucida*.—Flower very large, opening star-shaped, brilliant vermilion pink, darker in the centre; petals pink-white at the tips; stamens orange; leaves large, with large deep chestnut-coloured marblings on the upper surface, and streaked with red-brown on the back.
- Marliacea albida*.—A superb variety and very vigorous; flowers enormous, 8 inches in diameter, milk-white, the outside petals flaked with pink at the base; stamens sulphur-yellow.
- Marliacea carnea*.—Flowers of great width; colour very bright flesh-pink, fragrant; stamens sulphur-yellow.
- Marliacea chromatella*.—One of the first hybrids obtained, but still always in great request. Flowers canary-yellow, very large, and long-lasting; stamens sulphur-yellow; leaves marbled with brown on the top and streaked with rich brown underneath.
- Marliacea flammea*.—A grand variety with a large wine-red flower, shaded and flaked with white at the tips of the petals; stamens rich red; leaves marbled with chestnut-brown on the surface, as in *Chromatella*.
- Marliacea ignea*.—One of the most remarkable hybrids. Flowers large, of a fine uniform carmine-red colour; stamens fiery orange.
- Marliacea rosea*.—Very like *M. carnea* in general appearance and size, but of a brighter pink. The inside surface of the sepals is tinted with pink; stamens sulphur-yellow, fragrant.
- Marliacea rubra punctata*.—A very choice variety; flowers mauve-red tipped with carmine; stamens orange-red.
- Odorata exquisita*.—Flowers of very elegant shape, medium-sized, standing 4 to 5 inches out of the water, of a fine deep pink and sweetly scented; stamens golden yellow; upper surface of the leaves dull green, under surface red.

Odorata rosacea.—A very vigorous variety, with flowers of a soft pink, with sweet perfume; stamens golden yellow.

Odorata sulphurea.—Flowers sulphur yellow, radiating from a stiff stalk raised 5 or 6 inches above the water; stamens golden yellow; leaves spotted with chestnut on the upper surface and streaked with rich brown underneath.

Odorata sulphurea grandiflora.—One of the finest varieties, having the same qualities and habits as the preceding, only that its flowers have pointed petals, and are larger and more double.

Pygmæa helvola.—Flower very graceful, canary yellow of small size; stamens golden-yellow; leaves spotted with brown on the surface, and speckled with chestnut colour underneath. This variety has the advantage like *N. pygmæa* and *Laydekeri rosea*, of being capable of being cultivated in small vessels, such as dishes, basins, &c.

Robinsoni.—Flower wonderfully coloured, violet-red vermillion, shaded with ochre towards the centre; stamens rich orange; leaves spotted on the stalk with chestnut-brown, and streaked with deep red on the back.

Sanguinea.—One of the most appreciated varieties, producing at some times very rich carmine-amaranth flowers, and at others clear carmine; stamens orange-red.

Seignouretii.—Flowers medium-sized, projecting from 5 to 6 inches from the water, shaded with pink and carmine on a ground of pale yellow; leaves marbled with brown on the stem, and streaked with red-brown underneath.

To this list we must add some very fine varieties obtained from the United States: *N. caroliniana*, flesh colour; *N. odorata Luciana*, carmine-pink; *N. tuberosa Richardsoni*, pure white; *N. tuberosa rosea*, pink. Besides these *N. Dogueana*, *Gurneana*, *Falconeriana*, not yet in commerce.

Lastly, it is only fair to mention *N. Caspary* or *spharocarpa*, from Sweden, which has had a certain run, but is now quite eclipsed by hybrid novelties of the same shade, but more free-blooming; it is therefore doomed to disappear from ornamental collections.

Another noteworthy plant is *N. Froebeli*, a seedling from Caspary, but "bright pink with a scarlet-red centre," according to the description given by its originator, M. Froebel.

Such is the enumeration of the brilliant array of Water-lilies

which can be most effectively grouped together in the open air in the waters of all the temperate countries, and also in those towards the north.

The first difficulties of hybridisation have now been overcome; an impetus has been given to this most interesting pursuit; and there is no doubt that new seedlings and varieties more remarkable and more perfect than their predecessors, both in form and colour, will shortly arrive on the scene to still further enrich the domain of aquaculture. It is only necessary to have experienced the irresistible admiration which one feels on seeing a fine group of hybrid Water-lilies to be convinced of the leading position which will be assigned in the future to this new branch of horticulture. What sight can one imagine more imposing or more enchanting than that of a piece of water profusely peopled by these graceful plants, with their elegant foliage, and their corollas diapered with the most brilliant colours, and spreading for the space of five months in the year without interruption upon the surface of the water, where the slender dragon-flies flash the enamel of their scaly armour and reflect the splendour of their transparent wings; where shoals of gold-fish with their scales of coral and vermilion swim like a squadron of ships on a cruise; with the margins of the pools surrounded by luxurious masses of Bamboos, Yuccas, Eulalias, Pampas Grass, and other exotic plants which present to the charmed gaze the illusion of an entirely oriental situation!

The realisation of this magic ideal has excited a universal enthusiasm for this new style of gardening, in which England shows so much emulation, and occupies the foremost rank on account of the number and splendour of her collections. It is a fact that the climate of Great Britain is very favourable to these plants, for they do not require an excessive amount of heat; indeed the flowers, particularly the deep-red ones, often suffer in tropical countries from too fierce a sun. It is also to be remarked that Water-lilies keep open longer under a cloudy sky than under one that is too glaring. One must not, however, jump to the conclusion from this that they prefer quite shaded places, as this would be entirely a mistake. The best conditions for their prosperity are plenty of air and light.

In addition to the delightful ornament which the flowers of Water-lilies furnish for aquatic purposes, they are also most

useful for the decoration of flower-vases in rooms, dinner tables, for church purposes, &c. At first sight one might suppose that their habit of shutting up at night would prevent their being used for such purposes; but this obstacle is got over by a very simple remedy, which is to turn back their petals so as to make them convex instead of concave. When they are turned back after this fashion they keep permanently open until they are faded. Thus one sees what glorious opportunities they afford to organisers of festivals and for floral work in general.

The cultivation of hardy Water-lilies is of the simplest, and in no way differs from that of the common indigenous *N. alba*. Nevertheless, to carry it out under the best conditions, it is as well to use certain precautions which are easily observed.

Most of the *Nymphæas* called "out-door," although nearly all equally hardy, frequently differ among themselves in their early or late blooming, in their standing up above the water or floating on it, in their flowers being many or few, or in their general structure and growth being compact or wide-spreading. Some of them form strong clumps which constantly increase in strength, but do not spread about, whilst others are of a roaming nature, their stolons and interlacing rhizomes wandering over a large space, and quickly spreading across the roots of other varieties. In natural lakes and ponds it is impossible to prevent this undesirable confusion; but this irregular growth should not be permitted in artificial basins and aquaria, where each object in the collection should remain distinct and thrive independently; besides it would not only produce inextricable confusion amongst the plants, but the weaker ones would be infallibly smothered by the stronger-growing ones. In order to obviate this difficulty it is indispensable that the Water-lilies should be planted separately and at proper distances, or else in pots or in stonework basins of which the sides and bottom have been carefully cemented.

The form and extent of the basins of water matter little: it is optional, according to the taste of the individual grower. Still a diameter of over thirty feet will be detrimental to perspective, as it will be too far for a clear view.

It is very important that the basins should be divided into several compartments by partitions, which should not be higher than three-fourths of the depth of the water, in such a way that

they only prevent the roots and rhizomes from meeting, without preventing the leaves from intermingling on the surface. Two feet down from the bottom of the kerb-stone is enough for the depth of the basins. The outside walls ought to be decidedly slanted outward, so as to run less risk of their being damaged by hard frosts and the pressure of the ice, which would certainly happen if they were built straight up.

A bed of earth six inches deep on the bottom of the basins will be amply sufficient for the culture of Water-lilies and for most other aquatic plants: it ought to be as free as possible from gravel and stones. The best kind of earth is heavyish loam from the garden or meadow, but earth composed of leaf-mould and alluvial soil is also very suitable. One can also make a mixture of them, but it is better not to put with them any fresh manure which is still undergoing fermentation.

As regards the choice of water, that which comes from a stream or river is to be preferred, though that from wells will do. When the water is taken from running springs it ought in summer to be turned off from the basins, so as to keep the temperature of the water the same as that of the air; for it is essential to remember that *Nymphæas* thrive best in *stagnant* water, or at least in a very gentle current.

In stocking a basin with Water-lilies the object should be to obtain by a harmonious combination and sequence of shades and colours a generally dazzling effect, and for that purpose plants with high stalks should be avoided, as that would destroy the general view. It is necessary also to suppress *Confervæ* and those Mosses which are too compact, and certain under-water plants which are clogging and clinging, such as *Chara*, *Cabomba*, *Vallisneria*, *Elodea*, *Potamogeton*, &c., which live at the expense of the Water-lilies without adding anything to the ornament of the picture. Nevertheless it is as well to except from this proscription *Tropas natans* and *T. verbanensis*, *Stratiotes aloides*, and *Aponogeton*, which are quite worthy of being admitted into the society of Water-lilies.

The *Tropas* display gracefully upon the surface of the water their triangular leaves, with swollen petioles, disposed in rosette-like form, those of *T. verbanensis* being larger and particularly distinguishable by the stalks and veins of the leaves being of a pretty red colour. The fruits of these two annual kinds, known by

the name of Water-chestnuts, are eatable. It is sufficient to throw them into the water in spring, when they will make a good display without further trouble. *Stratiotes aloides* also forms very graceful groups of rosettes, which are like real Aloes. The *Aponogetons*, with their oblong floating leaves, furnish throughout the year a constant succession of lovely waxen and sweet-smelling flowers, and they are the more worthy of taking a place beside the Water-lilies, and of being particularly recommended to aquaculturists, as they have produced some splendid varieties, with flowers and leaves brightly tinged with pink and carmine, and much larger than those of the original type. These charming varieties, not yet in commerce, are the object of the greatest care at Temple-sur-Loir, and are destined by their hardiness, which will allow them to grow without protection in England, to play a prominent part amongst water plants from the double point of view of the decoration of aquaria and for a trade in cut flowers. It is to be noted that the *Aponogeton* is the plant of all others for growing in the running water of springs, where it prospers to advantage, and flowers most freely and without ceasing.

The propagation of hybrid Water-lilies does not differ from that of the original species, and is effected for the greater number of varieties by the pulling to pieces of their stumps and by the detachment of their tubers. Some individual plants, such as *N. Laydekeri rosea*, do not give any offshoots, but this case is a rare exception. Others bear seed, but the resulting plants have always a tendency to degenerate and to revert to the original type. To be certain of keeping the exact peculiarities of each variety it is much better to have recourse to increasing them by the division of their stumps.

The planting of them can be carried on all through the spring and summer, and presents no difficulty, as it only consists in fixing them in the earth at the bottom of the basins. At the same time it is as well to notice that when it is necessary to alter entirely the planting of aquaria, it is better to undertake it in good time, *i.e.* in April or May, so as not to keep back the time of flowering too much.

If you wish to obtain new varieties you must have recourse to seed and to hybridisation. The method of sowing is quite simple. It is only necessary to place the seeds in shallow

vessels in the spring, and carefully keep them full of water. The work of hybridisation is more complicated, as it is necessary to entirely cut away, at the very first moment of expansion, all the stamens of those flowers which you wish to artificially fertilise, and on the second day to dust their stigmas with a brush, covered with pollen from those kinds chosen for the crossing of them. It is worthy of remark that success in hybridisation depends principally on the care of the operator in only employing subjects of a vigorous growth, well chosen, and fitted to produce types that will be very free blooming and of perfect forms and shades. The flowers generally sink after the third day of blooming, and the pods which they produce, which are like those of the Poppy, come to maturity at the bottom of the water. They come half open, when they are ripe, and allow a multitude of seeds about the size of small pearls to drop out, and these immediately rise to the surface surrounded by a gelatinous substance. They must then be collected at once, with the aid of a small strainer, as they only float for hardly a single day, and then sink straight to the bottom, from which the sticky substance prevents them from moving. After their capture they should be kept in water, so as to keep them more safely until they grow.

People who are unprovided with basins of water, and who wish to start on the culture of Water-lilies, can very well make shift with casks sawn through the middle and firmly surrounded by iron bands round their edges. In temperate countries it is unnecessary to protect these tubs against the frost, but in cold countries they must be protected. To do this a trench is made of a depth of about one-third the height of the tubs, which are then placed in it and banked up to their edges with the earth dug out. One would hardly believe what a charming effect can be produced by tubs arranged in this style, with art and symmetry, and clothed with Ivy.

Water-lilies are blessed with a surprising vitality, which allows them to live for quite a long time out of the water, and, in consequence, to survive very long voyages without being any the worse. For example, in 1889 I sent to the Universal Exhibition at Paris a collection of my hybrids in a case which was lost on the railway, and which could not be found for over a month. I was then obliged to replace this first instalment. Some time

afterwards I received a memorandum informing me that the package had been found, and asking me what should be done with it. Feeling certain that the plants would be dead, I ordered them to be sent back by slow train; but on their arrival I was utterly astonished to see them in good order and covered with shoots, and very little the worse for being so long boxed up. To show the advantage of the endurance of Water-lilies I ought to add that I have thrown waste plants on to the earth surrounding the ponds, and have found their roots still quite sound after having lain six months on the open ground.

Cultivators of aquatic plants have often shown great anxiety about the supposed havoc caused by water-rats and mussels; also by different kinds of insects, fish, &c. I think that their fears have been exaggerated, because for my part I have only had to complain seriously of the ravages committed by two kinds of larvæ, the one black and the other white, produced by certain small yellowish-white butterflies which deposit their eggs on the floating leaves. These larvæ, at first almost invisible, grow to about the thickness of a wheat straw, and devour the leaves of the Lilies during the night; also those of the *Aponogeton*, *Limnocharis*, &c. They are very clever in hiding themselves during the day, laying fragments of the leaves on their bodies and covering themselves up with pieces of *Lemna palustris* or *Azolla*. Their devastation would be serious if it could not be easily stopped by pouring on the surface of the water some drops of a mixture of three-quarters colza oil to one-quarter of paraffin, a sufficient dose to poison and destroy them without hurting the plants. The climatic conditions of England are without doubt inimical to the existence of these voracious larvæ; but, in any case, I have pointed out the infallible means of suppressing them.

I should not bring this dissertation on Water-lilies to an end without bestowing a few words on the splendid section of the Cyanea, or blue Water-lilies. It is greatly to be regretted that hitherto all attempts to cross them with their hardy congeners of the northern hemisphere have so far failed. It would be a great triumph to add to the already sumptuous collection some hardy hybrids of a sky-blue colour with a delightful perfume. They are very variable, as from the seed of *N. zanzibarensis* one can obtain the most beautiful colourings of deep blue, tender blue,

intense violet, clear violet, violet-red, pink, &c., that it is possible to imagine. But, alas! these charming varieties, which have also the advantage of being day-flowering, will only thrive with a considerable amount of heat. At Temple-sur-Lot, which has a great number of running springs, they are grown all the year round in the open by the following means. From the end of October to April 15 we pass through their basins a constant current of water from the running springs to preserve them from the cold, and as soon as the cold is less intense we turn off the springs, so that the temperature of the water in the basins becomes the same as that of the air. By these simple means it is possible to enjoy for five months the flowering of these grand plants, which, like some of the *Nelumbiums*, have a decided tendency to acclimatise themselves in the south of Europe.

As regards the *Nelumbiums* their position is too important amongst decorative aquatic flowers to pass them by in silence, and I have not yet given up all hope of obtaining in time varieties sufficiently hardy to live without protection in England; for it must be remembered that they are nearly as hardy against the frost as the indigenous Water-lilies, and that the only obstacle against the realisation of this hope is the fact that they require, in July and August, a greater degree of heat than the Water-lilies for the ripening of their rhizomes, which renovate themselves in the heat of midsummer. It is in April that the *Nelumbiums* begin their growth, and when their first floating leaves appear, followed shortly by larger ones, which stand up 2 ft. or so above the water. They display themselves majestically like vast air bubbles hanging from a very slender stalk, and the drops of rain or from the waterpot roll off them sparkling like diamonds from their concave and velvety surface. The flowers have an exquisite perfume, and are of the size of large *Pæonies*, appearing in July, August, and September. They are of many very rich shades of pink, white, red, yellow, carmine, and lilac. Some double varieties have been obtained lately, with about twenty-four petals, which will no doubt still further augment the already great fame of the charming *Nelumbiums*, whose temperament it is so desirable should acclimatise itself to the climate of England.

[*Nelumbiums* have been grown in the open air by planting them in tubs whose upper rims were sunk a foot or 18 inches

below the surface of the ground. In winter a sheet of glass is placed over the tub, and the foot or 18 inches packed full of straw rubbish. In May the straw is taken out, but the glass left on until the growth of the plants necessitates its removal.—ED.]

NOTES ON THE NEWER OR LESSER KNOWN WATER-LILIES.

By Mr. JAMES HUDSON, V.M.H.

I do not suppose anyone has ever ventured to find fault with the common white Water-lily from the point of criticism as regards its charms, but, on the contrary, all must have been compelled to admire its purity and beauty. It is undoubtedly one of the most beautiful of what we term "Wild Flowers." For a long period, however, it stood alone in its colour, and of hardy varieties with coloured or tinted flowers we had but a very few. Now we have other white varieties under cultivation, and the coloured ones are fast increasing. I am under the impression that the coloured varieties, even when first heard of, were looked upon as being too tender to be grown in our ponds and streams. Such, for instance, as *N. alba-rosea*, *N. odorata*, and its form *N. odorata rubra*, which is known as the Cape Cod Water-lily and *N. tuberosa*. The opinion which prevailed was undoubtedly that of questionable hardihood; hence their culture did not extend as it should have done. Such impressions as these are, however, now being fast dispelled; yet there remain some even still who do not realise that these lovely Lilies are really as hardy as our own white variety. I cannot exactly say when *N. alba-rosea* first came under notice; but I recollect now some few years back having read a notice of it in the gardening press. This was, as it were, the starting point in my case, and I long desired to possess a plant; but the price when it was first put into circulation was prohibitive. In course of time, by the kindness and generosity of the Kew authorities, I obtained a young plant, and also one of *N. tuberosa*. Then when later on a coloured plate or two was issued through *The Garden* my enthusiasm was increased, and finding, as I had done, that *N. alba-rosea* was quite hardy, I ventured to add twelve other varieties, or forms, as a further

test. These were *N. Marliacea candida*, *N. Marliacea rosea*, *N. Marliacea carnea*, *N. Marliacea chromatella*, *N. odorata rubra*, *N. odorata rosacea*, *N. odorata exquisita*, *N. odorata sulphurea*, *N. odorata sulphurea grandiflora*, *N. Laydekeri rosea*, *N. pygmæa helvola*, and *N. flava*. Of these I only lost the last-named variety, which comes from Florida; hence it is not sufficiently hardy. This was in the spring (about the middle of April) of 1894. The winter following, which was a most severe one, soon afforded me a sufficient test of their hardihood, except in the one instance already alluded to. Our lowest record that winter was, I think, 26 deg. of frost; and as the Lilies, by reason of being small, were as yet in shallow water, the ice must have almost reached their crowns. The following spring the eleven all started into growth with increased vigour, and by the autumn were strong plants with occasional flowers. In the spring of 1896, owing to the satisfactory growth during the previous year, I resolved to give them more room, and proceeded to lift them during April. To my surprise they had rooted so strongly as to require three pairs of hands to remove the largest ones with all the roots that could be secured with each stool. In the case of the strongest plants the roots were as large as one's fingers, and they had taken a firm hold of the bottom of the lake. I might mention here that when I first planted them in 1894 I only used medium to large-sized Strawberry punnets in which to plant them previously to putting them into the water. This instance is some indication of how they will thrive when in congenial quarters. But very little, if any, check was noticeable in the growth during that spring (viz. 1896), and by the summer they were again rapidly increasing in size and vigour; whilst, as regards flowering, there was a marked improvement both in their freedom and in the size of the individual blossoms. Since that removal I have not again touched these plants, save to take away a few offshoots. During last summer (i.e. 1897) there was again a marked improvement manifest in the growth and also in the larger size of the flowers, as well as in their freedom in producing them. This past spring they all again started away very freely, and in every case promised well.

I have explained the treatment as regards removal, &c., of these varieties; and I might add that I shall continue to adopt

the same practice with other varieties since added to our collection as may be found necessary. I think at first when introducing these Water-lilies to any lake it is better to keep them fairly close together. Thus they are more immediately under personal observation, and if needful it is easier to protect them from injury by water-fowl or other enemies. In the removal alluded to I placed each stool into a round basket, such as plants are packed in for transit. These suit the purpose admirably, as the soil added is retained in close contact with the roots. If merely dropped into the water there would be the possible chance of the soil being washed away from the roots, and this is not desirable. Our plan is to prepare the soil as for plants in pots. We use fairly good loam and decomposed leaf-soil, with old mushroom-bed manure (cow-manure would possibly be better). Some road grit is added, and a rather free use is made of bone-meal, which we find suits them very well. Each plant in this way can be well covered with soil and its roots protected; afterwards, in due course, the roots will extend and the plants settle down firmly. The advantage even then is apparent of placing them in baskets, as the crowns are well elevated above the bottom of the lake, being thereby easier to remove or for the taking off of side growths for extension of stock. Should it be found that any one variety needs to be in deeper water, or *vice versa*, it is easier to remove them, during the first season at least.

After my experience of the first winter, although I only lost the one variety (*N. flava*), and that a comparatively tender one, I deemed it advisable, as a little precaution, to afford a small degree of protection. Most of us, no doubt, have noted that the ice is often thinner, and not so safe for skating, where rushes are growing. I took the hint from this, and during the following winters (except the last one, when no such precaution was needed) I have cut the tops of *Typha latifolia* (the large Reed Mace, erroneously called the Bullrush) off close to the ice, and then placed them over the crowns for the time being. This was done as soon as the ice was safe enough to bear. It also served a double purpose, as no skating over the crowns was then possible with the prospect of an immersion upon them. This simple protection serves the purpose well of preventing the ice from thickening so much as where exposed. Long litter will, of

course, serve the same purpose, but it does not look so well. When a thaw sets in the protection is removed by the use of a rake before the ice disappears. During the last two winters and springs I have noted that some of the varieties have retained their foliage partially through those seasons. The undeveloped flower-buds even of some have kept their heads above water all the winter. Those showing these tendencies the most were the varieties of *N. Marliacea* and *N. odorata sulphurea*, as well as its larger form. Even our London fogs did not appear to have much effect upon what was above water (below water the dense deposit of soot would no doubt be an advantage when absorbed).

POSITION.

The spot chosen for Water-lilies should not be shaded by trees so as to affect the growth. In these places the water is relatively cooler at times. I noted this in adding two varieties in the spring of 1897, which, for want of a better place at the time, were put too much under the shade of a copper beech. I can plainly see that they will have to be moved to a more open position, as no satisfactory increase in vigour is evident. An open, sunny place, where the water is warmed during the day, is the best choice, and if not too far away from the land it will be all the better, so as to be able to remove any sticks or other floating matter, as weeds, without in every case having to enter the water. (When this is done we use long waterproof wading boots, which for cutting the blooms are a great convenience.) The smaller varieties, too, are seen to better advantage when nearer the sides, where they can be looked down upon. We make thus far three various grades of our varieties: the robust growers for the deepest water needed, which would be from 18 inches to 2 feet to the top of the crowns; the smallest kinds have about 8 inches of water over them, and the medium growers from 1 foot to 15 inches. I do not think it is necessary, nor do I deem it advisable, to place them in deeper water than just quoted for each class of plant.

I have no doubt whatever that a pond with a muddy bottom, say, as an instance, a foot or so deep, with a rich deposit of decaying vegetation, would be congenial to them. In our case, however, this does not occur at such a depth. There may be 3 inches or 4 inches of mud, but not much more where our Lilies

are growing; yet they thrive well, and hence we may conclude that a great depth of mud is not essential. There is, as a matter of course, an amount of leaves which fall on the water and after a time sink: these frequently blow to the sides, and are often deposited in the right place to assist the plants in our case. I have not had an opportunity of testing these Lilies in running water, nor should I choose such a spot for them. Our lake is nearly always at one level, or close upon it, with a regular supply by means of a spring. The water from this source is deemed "hard," but the exposure and admixture ere it reaches the plants no doubt prevent any harm being done. I have an idea that water strongly impregnated with lime, or that from springs on the chalk, would not be so suitable; but of this I have not so far had an opportunity of making any experiments. From what I observed, however, in one case the leaves were considerably marked, and the flowers too, by a chalky deposit. I have only so far heard of one direct or even partial failure, and that I cannot explain. I am under the impression that it was owing to the running water, not far from which there is, I believe, a mill; but for what purpose it is used I do not know; it is, however, possible that some floating matter may have had deleterious effects. I believe that Monsieur Latour-Marliac, to whom we are greatly indebted for so many fine hybrid Water-lilies, is located in a favoured spot, where springs abound from which issues forth warm water. If this be so it should be a great assistance in hastening on the growth from the seedling stage to the flowering plant. I believe, too, that M. Marliac grows a good number in tubs. This may, however, be only for the greater convenience of propagation and after removal. That they may be cultivated in this manner, however, in this country has been clearly demonstrated at Burford Lodge, Dorking, where Sir Trevor Lawrence, Bart., has a good collection under the care of Mr. Bain. I believe that the tubs are protected sufficiently during the winter, to prevent the water from freezing, by means of litter or leaves. If not in such a natural style as one would prefer, there is at least one merit in the tub culture, viz. that of an easy inspection. In one garden in North Wales with which I am acquainted, viz. The Plas, Tan-y-Bwlch, a start has been made by Mr. Roberts, gardener to W. E. Oakeley, Esq. This has been done by forming an entirely new pond for their special culture; and as this is well

placed it should give good results, as from a terrace above it will be possible to view the flowers with advantage. At Gravetye Manor, the seat of William Robinson, Esq., who is no doubt the pioneer of the extended culture of these Lilies in England, they are grown chiefly in one lake, through which a steady flow of water goes on to another lake on a lower level. Here around the sides they thrive surprisingly well. The plants in question having been planted for some few years have gained in vigour immensely. I noted this in particular in the case of *N. Marliacea carnea* and *N. Marliacea albida*, the flowers of which with the increased vigour of the plants stood well above the water level. Other kinds, not of such vigorous growth, were not then thriving quite so well through an accumulation of a form of *Conferva* which almost choked them at that time. By experience gained since that visit I surmise also that these medium growers had almost too much water over them. The position of this pond is admirable; the sloping banks down to the margin of the water affording good standpoints from which to view them.

Another method adopted by an enthusiastic cultivator in Berkshire, Sir W. J. Farrer, Sandhurst Lodge (gr. Mr. Townsend), is that of forming small lakelets or pools on various levels, so that the water flows from one lot to another. This also is a successful mode of cultivation.

A somewhat similar method is adopted at a place in Sussex, but on a smaller scale. At Shipley Hall, near Derby, the seat of E. Miller Mundy, Esq., a keen enthusiast in gardening, Mr. Elphinstone has formed a collection, and these Lilies, like other things there, will no doubt be a notable feature. I do not know, however, under what special conditions they are being grown. At Aldenham Park, the seat of Lord Aldenham, another collection has been formed by Mr. Beckett, who may be relied upon to make their culture a success. In one garden, at least, in the Eastern Counties these Lilies have been cultivated for some few years, and from notes I have read they are thriving well. At Cheshunt, J. T. Bennett-Poë, Esq., has for some few years past had them thriving in the most successful manner. This collection, under the care of Mr. Downs, is composed of the very best varieties. In one place at least in Scotland their culture was this past spring taken up by Everard F. im Thurn, Esq., a well-known traveller and writer, who has formed the nucleus

of a collection, and with whom I have had correspondence. I shall be interested in knowing the results later on in this instance.

At Kew Gardens several of these Lilies are grown in a brick tank at one end of the herbaceous ground: here they flower very well, but cannot extend in a vigorous fashion by reason of the limitation of root development. In another part of the Gardens a pond has been made, and this should prove to be an ideal place for them, as the exhaust steam is taken into this water from the waterworks. At the Oxford Botanic Garden they are grown in the warm Lily tank, where they thrive well, sending up fine flowers. From seeing them in such tanks as these one might be induced to consider them only as semi-hardy; but such is, as I have already stated, very far from being the case. From the many letters I have received from gentlemen in all parts of the country asking for information respecting these Lilies, cultural and otherwise, I have abundant proofs that already there are many who are entering upon their cultivation. Further proofs also of this have come to hand regarding some of the finest varieties which have been distributed more recently: of these the stock is for the time exhausted, that is, of saleable plants. Those varieties first sent out appear to be more plentiful; hence they are easily obtainable in the trade, and at really cheap rates. It is these varieties that I would recommend any one who contemplates making a start in their culture to select in the first place. If perchance the water for some reason was not found to suit them, then the loss, if such a thing were really to occur, would be but trifling. (I have never heard of one plant failing except in the case of my own piece of *N. flava*.) Concerning the newest and choicest kinds, amongst which there are some wonderfully rich colours, and with flowers of extra size, it should be said that the same effect is produced upon them as upon other plants; that is, for the time being, a weakening of the constitution is noticeable, owing to rapid propagation for securing a stick. Therefore do not expect too much from them the first season or two; they will regain their natural strength and vigour in due time. In dealing with all varieties to which one may be a comparative stranger as regards habit and vigour, it is best not to keep them in too great a depth of water. Sink them deeper, if desirable, as they gain strength.

For fountains these Lilies should be great acquisitions. So far as I have gone, I have not had an opportunity of testing them in this manner, but I know from the style of growth of the best known varieties that they would be as well, or even better suited than the common white variety itself. The habit of several kinds is more compact with much less vigour than in the species just named. Many of these, too, have positively ornamental foliage, some with reddish leaves, others with tints of bronze, and others being maculated, marbled, or spotted with red and bronze on a green ground. Each variety, as seen in its full vigour, stands out in nearly every case quite distinct, and may often be recognised by its foliage alone. Some varieties possess a much better habit than others, being more disposed to make back breaks; thus they are propagated more readily. Those which do not do this may be severed, or notched, to induce them to form back growths, as in the case of some Orchids. Some kinds form a perfectly circular mass of foliage, producing a beautiful effect upon the water in this way alone. *N. Robinsoni*, *N. Seigneur Eti*, and *N. lucida* are all cases in point.

PERIOD OF FLOWERING.

I have only taken notes of this during the past two springs. Last year I noted the two earliest to flower were *N. alba-rosea* and *N. Laydekeri rosea*: these opened their first flowers on May 31 and the following day, there being no practical difference between the two. This year the first to open its flowers was *N. Ellisiana*, on June 2, whilst those aforementioned were about three days later. Mr. Bennett-Poë informed me that he noted his first blooms were open on or about June 5 this year, so there was scarcely any difference between us in point of earliness. I can see that other new kinds are promising to flower early. *N. Aurora* and *N. Andrcana* are both instances of this. *N. odorata* and its forms are, most of them, later by ten days or a fortnight, whilst in the case of *N. odorata sulphurea* it is fully a month later; but the latter, when it does flower, is so very distinct. *N. odorata sulphurea* is to the Water-lilies what a good form of the Cactus Dahlia is to the Show varieties: its narrow-pointed petals make it quite a distinct feature. With me *N. alba* (our Common White) has not opened a single flower until fully fourteen days later than the earliest of

the newer varieties. By these notes it will be seen that a considerable gain in early flowering has been effected. The prolongation of flowering during the autumn is also remarkable. With favourable weather we have had them good at the end of September, and even into October, in the case of the forms of *N. odorata*, which appear to make up then for loss of time in the spring. The best season for flowers is from the middle of July to the first week in September, and the very best during August. When the weather has been dull and showery at these seasons the flowers will frequently remain open until 6 o'clock or later in the evening, even during clear moonlight nights at times. Should it perchance be raining, as in the case of a few showery hours, the effect upon the Water-lilies is most beautiful. They glisten and sparkle like diamonds in their settings; in fact, at such times they might fairly be called "water diamonds." A pleasing effect is produced even at the distance of from 100 to 200 yards, so rich and distinct are the colours.

AS CUT FLOWERS.

In a cut state for special occasions I can strongly recommend their adoption. Whenever we have used them they have been a source of great attraction and admiration. The position in which we arrange them to the best effect is in two white marble fountains of shell-like form. These by reason of their purity of colour are admirably suited to display any of these tinted Lilies to the best possible advantage. We float them in the water with as nearly as possible their own foliage as accompaniments. As it is chiefly for evening parties that they are used, we find it better to reflex the sepals for safety, otherwise they might be disposed to close up too tightly. (It appears to be the sepals which exercise a certain amount of pressure upon the petals: this may be noted in the case of all faded flowers.) By so doing, much as some may condemn the practice, we are enabled to make a much better and more lasting effect with them. In this state, with plenty of water in which to float them, they will last fresh and good for several days. In any case, they should be cut, as with the Rose, whilst still young, first-day flowers being the best to choose.

HYBRIDISATION AND PROPAGATION FROM SEED.

Thus far I have not done much in the way of hybridising, and that only during the summer just ended. With this object in view, I have made the culture of *N. stellata* a special feature, in order to cross it with the hardy varieties, if possible, hoping to obtain by so doing some distinct addition that may be grown in the open water, or practically a hardy blue variety. Whether I shall in any way succeed remains to be proved. With the others I hope also, at any rate, to make an attempt, if only from the point of interest as regards the behaviour of the seedlings. Seed has, I know, been sent home from Norway, and if that be good seed I see no reason why we should not save seed here also. It would be a boon if we could save seed here from some of the choicest hybrids, which are even still too scarce. Seed has, so I have been informed, been saved in some instances already, and the seedlings in one instance have appeared. How long it may be before any English-raised seedlings come into flower I am unable to say at present. I believe in one instance they have come up quite spontaneously from self-sown seed; this, even in itself, is interesting, and the result should be watched with considerable expectations for any variation that may arise.

VARIETIES.

I have thus far alluded to some of the earlier and still better known varieties of these handsome water plants, and I hope that when these remarks are read they may be the means of others entering upon their cultivation. I have at Gunnersbury the following varieties or species under cultivation, viz.—

N. alba, a species well known to all of us, and one well worthy of all that can be said in its favour. I would add, however, that where it thrives vigorously, as it does with us, it requires to be broken up occasionally, otherwise it becomes too dense for the flowers to be seen as they should be.

N. alba-rosea, also known as *N. Caspary*, has not much in common with the foregoing. It does not produce offsets so freely, being more disposed to keep to one crown; at least, such has been my experience of it. It is one of the very earliest to grow, and, as afore stated, to flower. In colour it is a soft rosy pink, and in size rather smaller than the type, compared with which also it is not so profuse in flowering, but nevertheless a

distinct acquisition. It is also one of the earliest to go to rest in the autumn, having disappeared beneath the water whilst some of the hybrids are still flowering.

N. tuberosa.—This Lily with me has developed remarkably during the past few years, and is now a very vigorous example. The foliage and habit are more robust than even in *N. alba*; whilst the flowers, which are quite as pure in colour, are oftentimes as much as 8 inches across. It takes its specific name from the tubers produced upon the stems, and may thus be easily distinguished when fully developed. It comes from the North-Eastern States of North America, and hence is absolutely hardy.

N. pygmæa is pure white in colour, like *N. alba*, being quite distinct in habit, with cup-shaped blossoms. It is of medium growth, hence well adapted for limited situations. *N. pygmæa* comes from Northern Asia.

N. odorata minor is a smaller form of the type, coming from North America also, but this has not so far flowered freely with me. It is of slow growth.

N. odorata, from North America, is also pure white and sweet-scented. Another characteristic is its multiplicity of petals, which are long, pointed, and narrow.

N. odorata rubra (the Cape Cod Water-lily), known as *N. o. rosea* by the Americans, has its petals suffused with pale reddish pink, deeper at the base. Like the type it is of quite moderate growth.

These are the species and their forms as grown at Gunnersbury. The following are all hybrids, for which we are indebted to M. Latour-Marliac, who for years has greatly interested himself in this branch of horticulture, viz.—

N. Marliacea albida, the grandest white variety of which, I think, there is any record. I have cut flowers of it fully 9 inches across, but even this size has been exceeded. The colour is of the purest white (more so than in *N. alba*); the blossoms as they glisten in the sunshine are visible at a long distance off. The foliage, too, is of extra size with a bronzy suffusion.

N. Marliacea chromatella is almost a counterpart of the foregoing, being not quite so large in the flower or so robust in growth. The colour is a soft primrose, or chrome-yellow, fading with age. Like the preceding, it is very profuse in

flowering. The foliage is mottled and bronzed in the earlier stages of growth. In this respect it somewhat resembles *N. odorata sulphurea*.

N. Marliacea carnea is a most lovely and distinct variety: the blossoms are flushed with pale flesh-pink, this colour being deeper at the base. With age the colour fades and tones down to almost white at the extremities of the petals. It is a strong grower, and throws its flowers, like *N. Mar. albida*, well up above the water.

N. Marliacea rosea is somewhat similar to the preceding, but when flowers of both kinds are compared the difference is plainly visible; the rose tints are more fully developed in this instance, and the same shade of colours extends more towards the extremities of the petals, which are not so pointed and frequently broader. As regards its foliage, which is of a reddish bronze tint, and its freedom of blooming, it is similar to *carnea*.

N. Marliacea rubro-punctata is a newer and choicer variety: the colour is a deep vinous red, with purplish suffusion, and spots or blotches of carmine. In point of size it will, I think, fully equal the rest of this section. So far, we have only a single crown plant which has this season flowered very freely. Last season, too, we had a good number of blooms.

N. Andreana has flowers of handsome shape, rather incurved, and above medium size: the colour is deep red, with a tinge of violet when well developed. This, too, has flowered well, being most profuse in this respect, having had as many as twenty-four flowers expanded at one time on one plant.

N. Aurora.—With me, this comes of a clear canary yellow, without the tints of "rose-yellow to deep red," which it is described as possessing. It is possible I may not have got it true to name; at any rate, mine is a distinct and beautiful Lily of medium and compact growth.

N. Ellisiana.—This is, in my opinion, one of the choicest, as it is one of the richest in point of colour, of all the varieties. The colour with me is deep rosy purple, which intensifies with age. So far, mine has only one, or at most two crowns; therefore I expect to see a great improvement when more vigorous.

N. Seigneur Eti is a very compact-growing plant, with rather small foliage, which in itself is handsome; the colour is pale rose, with tints of creamy yellow.

N. lucida, of which I have only had a few flowers, is a clear pale pink, deepening with age to rose colour: it is a marked improvement, I think, upon *N. Laydekeri rosea*.

N. sanguinea.—This is one of the choicest of the new varieties, and is thus far very scarce: the colour is a deep blood-red, the flowers are large and the petals broad; it is one of the deepest-coloured varieties in cultivation. I have only had a few flowers upon my plant, which is of moderate growth.

N. gloriosa is well described by its name, as it is without doubt one of the very best of all the Marliac hybrids: in point of size it equals *N. Mar. albida*, whilst in colour it is a dark purplish red. Our plant has flowered fairly well, but it lacks vigour as yet; I hope another year I shall obtain flowers quite eight inches across. It is a vigorous grower.

N. Laydekeri rosea is one of the best known of the hybrids raised by M. Latour-Marliac. It is of medium growth, flowering most profusely, the colour being a soft rosy-pink, opening frequently almost white, but deepening in tint day by day. It continues to flower over a prolonged period. In growth it is disposed to keep to one stem, making but few offsets.

N. Laydekeri lilacea is a counterpart to all appearance of *N. Lay. rosea* except in colour, which is a clear rosy-lilac: its first flowers of this year opened late in June.

N. fulgens.—Another richly coloured hybrid, which I have not yet flowered to any extent; the colour is a purplish-rose. I have learnt from those who have flowered it freely that it is a grand Lily.

N. pygmæa helvola is the smallest Water-lily in our collection: it is quite a miniature in foliage and flower; the colour of the leaves is a bronzy green with darker markings, and that of the flowers a pale sulphur yellow. It is quite a gem.

N. odorata rosacea.—This and the following have larger flowers than the type: the colour is soft rose, paler towards the tips of the petals.

N. odorata exquisita.—In this variety the colour is a deeper rose, suffused with carmine. This and the preceding are quite gems in their way, being in addition sweetly scented. They are both moderate growers, flowering well when established, notably so this past season.

N. Robinsoni is a superb Lily of very close, compact growth,

making a profusion of foliage, which is marbled with reddish bronze : the colour of the flowers is a deep vinous red with slight traces of subdued yellow on each petal. The stamens, as in several of the darker hybrids, are of deep orange shade, thus increasing the attractiveness of the flower. Young plants of it blossom quite freely.

N. odorata sulphurea and *N. odorata sulphurea grandiflora* may be termed the "Cactus Water-lilies," as their petals are narrow and most numerous, likewise at times twisted as in the Cactus Dahlia. The colour is a clear deep sulphur-yellow, and in size quite equal to the *N. Marliacea* group. The distinctive affix of "grandiflora" well describes its quality. Last season these both flowered very well late in the summer, their blossoms being sent up some 6 or 8 inches above the water.

N. Caroliniana nivea and *N. Caroliniana perfecta* were both added last year ; but so far they have not made good progress, through, I have no doubt, being badly placed. They are both, I know, excellent varieties, with rather narrow petals, and sweetly scented also. In colour the former is pure white and the latter a deep flesh-colour. For fragrance these are, I think, the best of any.

N. flammea is our latest addition, but as yet it is not well established. In growth it appears to be moderate, whilst its specific name denotes its colour. It is in this respect more brilliant than *N. fulgens*.

PERPETUAL STRAWBERRIES.

By Mons. HENRY DE VILMORIN, F.R.H.S.

[Read August 23.]

STRAWBERRIES are so wholesome and health-preserving, as well as so delicious a fruit, that it is small wonder if every one should endeavour to make the season during which they are available last as long as possible. Now this achievement is actually not only a remote possibility, but an accomplished fact, and brought within reach of every one by the introduction of perpetual large-fruited Strawberries. We call those races perpetual which bear flowers twice or several times in the course of one summer as contrasted with those which usually bloom only once.

I say usually because the casual production of a few flowers out of season is a very frequent occurrence amongst cultivated plants: Pear trees, Horse-chestnuts, the common Lilac, Polyanthus Primroses, show frequent instances of the fact. But these are purely accidental freaks of nature, and do not constitute a permanent character. The expression "perpetual" is applied only to plants that yield regularly and certainly fresh crops of flowers at distinct periods in the same year, such as perpetual Roses, sweet Violets, and Alpine Strawberries.

These last have long been the only really perpetual Strawberries known in our gardens. The main object of the following paper is to introduce to the knowledge of the British public varieties of the large-fruited type which originated recently on the Continent or in America, and which are quite as perpetual bearers of flowers and fruit as any strain of the old Alpine. The introduction of these new sorts may mark as great an epoch in modern Strawberry culture as did the propagation of the Alpine Strawberry about one hundred years ago.

SOME WORDS ON THE HISTORY OF STRAWBERRY CULTURE.

It does not appear from any document handed down to us from antiquity that Strawberries were ever grown in gardens by the ancients. They are everywhere mentioned as wild fruit picked in woods.

It was probably during the Middle Ages, or perhaps only at the beginning of modern times, that the custom of introducing Strawberries to the house garden became established, with the result that new and improved strains originated owing to the plants being more amply fed, and especially to the close and constant observation to which the Strawberry plants were subjected.

Parkinson in 1629 enumerates several varieties of the common or wood Strawberries along with the Virginian, and a certain Bohemian Strawberry, with fruit of enormous size, the identification of which seems to be a difficult problem to solve (Park., "Par. Terr." p. 757).

Round Paris the common red, the white, and a bush Strawberry, quite distinct from the bush Alpine, were the principal sorts grown. At the time of Duchesne (who published in 1766 a valuable "*Histoire des Fraisières*"), the favourite strain for market

culture was the 'Fressant' Strawberry. It used to be raised in the south of Paris, around La Ville du Bois and Villebousin. The market gardeners at Montreuil, who were then as now amongst the most skilled and enterprising in their trade, went to these places in order to purchase fresh plants, which they fruited in their gardens for some years, constantly introducing fresh supplies of young plants from the places where they were reputed to grow best and cheapest. The introduction of the Alpine Strawberry put an end to the practice.

THE ALPINE STRAWBERRY.

This sort, which is generally considered to be a mere local variety of *Fragaria vesca* (although some botanists of note, as



FIG. 68.—COMMON ALPINE STRAWBERRY.

Duchesne himself and Persoon, held it at one time to be a distinct species), is found wild at various places in the European Alps.

The only difference noticeable between the Alpine and the common wood Strawberry consists in the fact that the latter

blooms only once in the spring of the year, while the Alpine bears flowers from April till November, and even later, whenever the weather is mild in the autumn. (Fig. 68.)

Duchesne was the first to give a complete and detailed account of the "fraisier des mois," as he calls it. He refers the plant to a kind mentioned by Cæsalpin ("Syst." 554) as "*Fragariæ* genus in albis Bargeis visum, bis in anno fructificans." The same is described by C. Baulim ("Pin." 326) as "*Fragaria* bis fructum ferens;" by Parkinson as "*Fragaria alpina* fructu compresso" ("Theatr." 757). Duchesne ("Hist." pp. 57, 58) considers that all the latter authors spoke of the plant merely on Cæsalpin's authority, who either saw the plant or heard of it from people who had actually seen it.

He (Duchesne), on the strength of Cæsalpin's description, wrote to a resident at Bargemon, in Provence, and satisfied himself that a kind of Strawberry was found in great abundance and in a wild state in the vicinity of the town, and having the peculiarity mentioned. Plants were sent to him at Versailles, where they succeeded well and became soon widely distributed.

A short time before that, in 1764, M. de Fougèroux de Bondaroi, returning from Italy, had seen similar Strawberries on Mont Cenis, and collected seeds which his uncle, M. Duhamel du Monceau, a great amateur and judge of plants, sowed with success on his estate at Nainvilliers.

It is said (Duch., "Hist." p. 56) that the same variety of Strawberry had been under cultivation for a few years about London at the same time, the first seeds having been sent to the King from Turin. The cultivation of the new kind spread rapidly around London, and was soon transferred from there to Holland.

The knowledge of the perpetual Strawberry may even be traced further back than to Cæsalpin's book, as the following passage occurs in a work of Jerome Back, better known as Tragus:—"Floret vero *fragaria* plerumque Aprili mense, demumque ad autumnum usque" (Trag. "Comm." Argent. 1552, l. i. c. 170, p. 499); and again from the pen of Conrad Gessner: "*Fragæ* vere et tota æstate florent inque maximam autumnum partem" (Gessn., "Coll." 1553, pp. 478 and 490).

The peculiarity of bearing flowers and fruit during the whole of the summer months was so well inbred in the race of Strawberry found at Bargemon and in the neighbouring mountains,

that all the seedlings raised from it from the time of its introduction down to our time, although they often showed some important variation in the size and colour of the fruit, never departed from the ever-bearing character of the original plant.

VARIETIES OF THE ALPINE STRAWBERRY.

Propagation by seed is much oftener resorted to in the case of the Alpine Strawberry than with any variety of the large-fruited kind; and although a particular strain is seldom reproduced absolutely true except by the use of runners, sowing is so



FIG. 69.—BUSH ALPINE STRAWBERRY.

cheap, so easy, and so rapid a way of propagation that most gardeners commonly have recourse to it. There is indeed a case in which there is no alternative to the increase from seed, and that is with the Bush Alpine or Gaillon Strawberry, which emits no runners. (Fig. 69.)

The original plant was obtained at Gaillon (Eure) by M. Labaube in 1811 ("J. fr. Art. fr. des Alpes"). Some years later (about 1818) M. Morel de Vindé originated the white-fruited bush variety. Both rapidly became popular, and entirely superseded the old Bush Strawberry for edgings and beds in small gardens. They are reproduced true from seed as far as the absence of runners goes, some variation occurring only in the colour of the fruit.

Of the numberless improved varieties which have originated

since the Alpine Strawberries were distributed in gardens, half a dozen or so (including the bush variety) deserve to be enumerated. They belong to our present subject, being all of them perpetual Strawberries. (Fig. 70.)

Janus.—A fine variety of the Alpine Strawberry was offered by Bruant, of Poitiers, about twenty years ago. It is a strong-

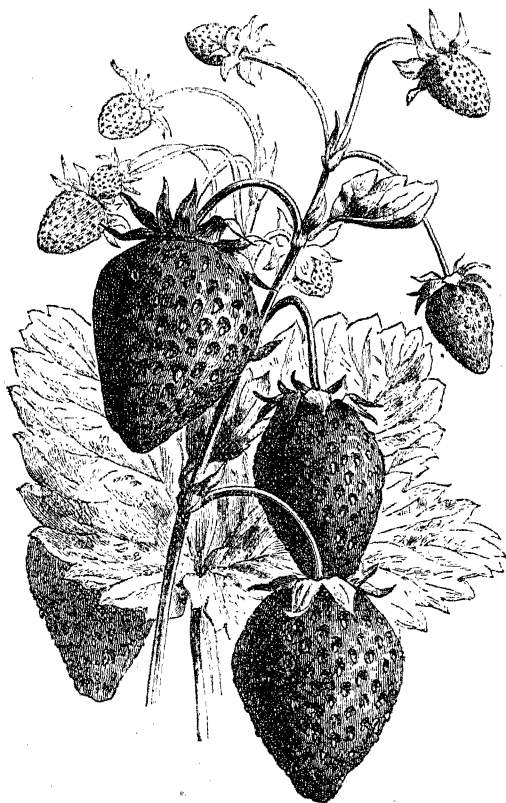


FIG. 70.—IMPROVED ALPINE.

growing sort; with comparatively large fruit, often double-pointed, which particular probably suggested the name of the double-faced god. It is still sometimes met with in cultivation.

Quatre Saisons Dure.—This bears a remarkably elongated fruit, not very delicate in flavour, but of a very bright clear colour, with somewhat tough dry flesh, of indifferent quality, but bearing

carriage wonderfully well, which advantage makes it highly profitable for cultivation.

Belle de Meaux was raised by Edouard Lefort, who is the successful originator of several large Strawberries, one of which bears his name; and others are *Souvenir de Bossuet* and *Le Czar*. *Belle de Meaux* is an excellent all-round Alpine, early, prolific,



FIG. 71.—BELLE DE MEAUX.

constant, and of superior quality. It is mainly distinguished by the deep colour of its ripe fruit, stems, and runners, which all turn nearly black during warm and bright weather. The peculiar colour rather disqualifies the fruit for market, but as an amateur's variety *Belle de Meaux* deserves the highest praise. (Fig. 71.)

Berger, a seedling of *Berger* (who raised *Dr. Morère*), combines the good points of the *Duru* Alpine with the eating

qualities of the original sort. It will not travel as well as the *Duru* when ripe; but picked just before it is quite ripe it will bear carrying very well, and beats every other Alpine by its size, colour, and eating quality. (Fig. 72.)

A GLIMPSE AT THE ANATOMY OF THE STRAWBERRY PLANT.

The practical difference between the single bearing and the per-



FIG. 72.—BERGER ALPINE.

petual Strawberry can be easily traced back to an anatomical difference, which consists in the production of flowering stems instead of runners from the axil of some of the leaves on the main stems.

The species included in the genus *Fragaria* appear to stand

on the very border between herbaceous and shrubby plants. Potentillas, which are next to them in the botanical classification, have a still wider range of organisation; some of them, as *P. anserina*, being perfect herbs, and some others, as *P. fruticosa*, being decidedly shrubs with woody permanent stems. Strawberries are mostly placed just on the intermediate step between the two. Their short-jointed, thick stems bear from eight to twelve leaves, at the axil of which a bud exists, which seldom becomes abortive, and mostly develops either into a branch similar to the main stem, or into a runner, or into a flower stem, these appendages being in a manner equivalent to and, so to speak, interchangeable with one another.

The runner at first sight appears as different as possible from the ordinary leaf-bearing stem: it becomes very plain, however, upon closer inspection, that it is merely an elongated branch, dissimilar to the original one simply in the great length of the internodes and in the diminutive size of the leaves, which are mostly reduced to mere bracts. But the runners show their identity with the normal branches in producing from their knots exactly the same appendages as the primitive stems do, viz. regular stems, runners, and even flower stems, and in bearing also abortive axillary buds occasionally. A vegetable axis which reproduces another axis similar to the one from which it proceeded cannot be called really different from it in nature. Now it is the case both in the Alpine and in the large-fruited Strawberry that runners issuing from the normal stems produce from some of their axillary buds new stems exactly similar to the original stems.

THE LARGE-FRUITED STRAWBERRY.

The vegetative organs are in the large-fruited Strawberry in the same organic relation to one another as in the alpine. There is consequently no reason why the same characteristics should appear in the one and fail to appear in the other. Barring the greater thickness of the runners and flower stems (which in either species are respectively very like to one another) the relations of number, position, and growth are just the same in both.

This is reason enough why the creation of perpetual varieties

in the large-fruited sort should have been in contemplation almost as soon as this sort originated.

The earliest facts concerning the large-fruited hybrid English or American Strawberry (as it has successively been called) are very far from well known. The first detailed account of it was given by Miller, in 1759, with a good figure. The plant seems to have been somewhat widely distributed at the time, and as both the Chili and the scarlet, or Virginian, Strawberry had been introduced some forty or fifty years, the opinion expressed by Duchesne ("Hist. des Fr." p. 197) that it is a hybrid between the two last named sorts seems to gain much credit. The original form, known in England as the old Pine, and in France as *fraisier ananas*, is to be found in gardens to the present day, answering perfectly to the elaborate description given by Duchesne ("Hist. des Fr." pp. 191-194). It is, in fact, intermediate between *Fr. chilensis* and *Fr. virginiana*, and the pale brownish colour of the fruit is in that respect highly characteristic.

It was only in the earlier part of the present century that skilful horticulturists began to originate named varieties of the large-fruited Strawberry, which developed in various directions the possibilities of the new race. Keen's, Myatt's, Rivers's, Turner's novelties were successively introduced, several of which even now hold a prominent place in the list of esteemed varieties; De Jonghe, of Brussels, Jamin, of Bourg la Reine, Gloede, of Beauvais, and Moret soon added most excellent contributions to the stock of useful kinds of the large Strawberry.

I will dwell here only on one of Gloede's seedlings, distributed in 1866, and called *ananas perpétuel*, because to it may be referred, as to their ancestor, most of the perpetual large-fruited Strawberries of the present day. It is not even mentioned in Dr. Hogg's "Fruit Manual," but it created some excitement at the time of making its appearance in consequence of its giving an autumn crop, although it was a scanty one.

It must be mentioned here that as early as 1856 the question of perpetual-bearing large Strawberries had been started in America; not that special varieties, gifted with a special quality, were offered for sale there, but in consequence of the opinion asserting itself that all large-fruited Strawberries could be made perpetual bearers by means of some special tricks in the cultivation.

Mr. Charles A. Peabody, of Columbus, Georgia, quoted by Mr. R. G. Pardee, wrote as follows:—

“In European gardens autumnal crops of Strawberries have been obtained sometimes by pinching off the flower stems in spring, suppressing the runners, and feeding and watering the plants liberally during summer; but this process partakes more of the art of forcing fruit than of the ordinary cultivation. What was needed was a variety of large-fruited Strawberry, flowering and bearing fruit naturally in summer and autumn, just as the Alpine does. *Ananas perpétuel* was a harbinger of the new races to come. After a short period of popularity, however, it seems to have sunk into oblivion.

“It is now well known throughout the Southern States that for many years I have cultivated the Strawberry extensively, and have had from my beds a constant succession of fruit six months in the year, and frequently have it ten. While I am now writing (December 24) one of my beds—of an acre—is loaded with ripe fruit, specimens of which I have sent to New Orleans, Montgomery, Savannah, Charleston, Mobile, and New York. This bed has scarcely produced a runner the past season. The causes of this will be found in my method of culture. . . . I prefer a sandy soil and new land. My grounds are on what are called ‘piney woodlands,’ hills and valley with never-failing streams meandering through them. I have taken the grounds bordering on the streams, ploughed them deep, and laid them off in rows two feet apart. I plant seven rows of pistillate (Honey’s seedling) and one row of hermaphrodite (early scarlet). I plant the pistillate for fruit and the hermaphrodite for impregnators; and the only two which I have found to bloom and fruit together the whole season are the Honey’s seedling and the large early scarlet. The first season I let the runners fill the ground; in the fall go through the grounds with hoes, thinning out to eight or ten inches, leaving the vines to decay just where they are cut up. I then cover the whole bed with partially decomposed leaves from the woods or swamps. I never use animal manure of any kind—nothing but the leaf-mould and an occasional sprinkling of wood-ashes. The leaf-mould keeps the ground cool and moist, as well as the fruit clean, and does not stimulate the plants to runners. The potash and acids contained in it are just what the fruit wants. A few years of this culture will check their

disposition to run and encourage them to fruit" ("A Complete Manual for the Cultivation of the Strawberry," 3rd edition. By R. G. Pardee. New York, 1857).

The next step was the introduction by the firm of Mabillet at Limoges of a diminutive new variety called l'Inépuisable, an account of which appeared in the "Revue Horticole," October 1,

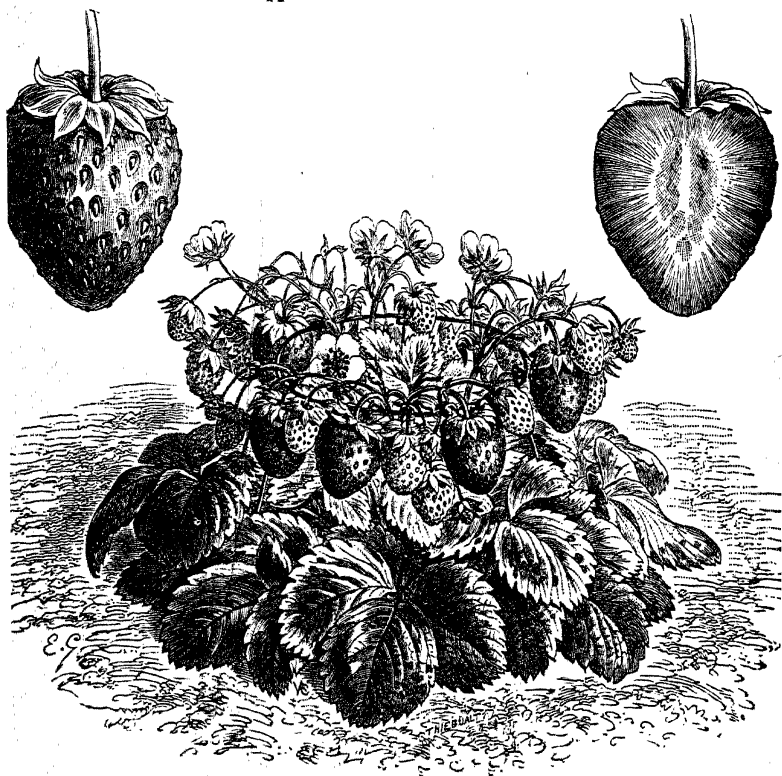


FIG. 73.—'ST. JOSEPH' PERPETUAL STRAWBERRY.

1871 (page 506). In the new plant the physiological problem was solved, in so far as the production of flower stems during all the summer and autumn not only took place, but was even frequent and uninterrupted; but the weak point was found in the defective organisation of the flowers, which, through lack of stamens or imperfect organisation of pollen, seldom set fruit, and when they did so produced only small, irregular, and scarcely eatable

abortions. L'Inépuisable was disappearing out of sight when a new sort was brought before the public as 'Roi Henri.' This was in most respects so like 'l'Inépuisable' as to be hardly distinguishable from it: it would scarcely deserve to be mentioned but for one important fact, viz., that it was the first production of the man who was to originate some years later the first really good perpetual Strawberry, Abbé Thivolet, of Chenoves, Saône-et-Loire.

According to the Abbé himself,* who has been for a long time a passionate lover of horticulture, he sought a departure in a cross between a large-fruited and the Alpine Strawberry. One ought to wonder if he had not. The idea is so obvious that the same cross was attempted times without number. But as it never succeeded, it is most likely that in the present instance it was equally inefficient. The facts related above show plainly enough that no such cross was needed for the production of a perpetual large Strawberry, and a change in the sexual development of the plant was, I think, more to the point than a change in the tendency to produce a succession of flower stems.

The fate of 'Roi Henri' turned out to be nearly the same as that of 'l'Inépuisable.' After calling forth a certain interest it was dismissed by the general public as a mere curiosity. But not so by its raiser. He persisted in sowing seeds of his Strawberry, both self-impregnated and crossed with other large-fruited kinds. His indomitable perseverance was destined to triumph at last. Next to Roi Henri he raised Robert Lefort and Léon XIII.; the latter especially he considered as promising. Although less floriferous than his previous seedlings, it set and matured its fruit better and more regularly. Finally, in 1893, a seedling appeared which flowered continuously from May till November,† and set a fruit for every flower. This was named 'St. Joseph'—with it "the perpetual large Strawberry was discovered." So the raiser puts it, and his boast is perfectly justified. (Figs. 73 and 74.)

Of course there is ample room left for improvement. The plant is rather dwarfish and depressed; the leaves, which are of a dark-bluish green, are mostly spread flat on the ground; the stems are short and need supporting to raise the fruit from the

* *Moniteur des Campagnes*, St. Quentin.

† On November 26, 1898, 'St. Joseph' was still blooming in my own garden.—Ed.

soil ; but, at the same time, the fruit is of fair size, heart-shaped, angular or coxcomb-shaped when produced by strong plants, with a deep scarlet colour, scarlet flesh, and brisk taste. Sweetness, acidity, and a rich flavour combine in exquisite proportions.

Notwithstanding the freedom with which flowering stems are put forth, runners also are produced in large numbers so as to



FIG. 74.—'ST. JOSEPH' DETACHED FRUIT.

insure a speedy increase of the new variety. It should really be introduced into every garden, were it only as the representative of a series of new Strawberries. With some extra care and management it may even prove profitable as a market plant for late summer and autumn sale.

Its raiser is too sensible to consider his achievements as complete and definite, and he is in the field as actively as ever raising and propagating new forms with the purpose of introducing, if possible, fresh seedlings, which may be distributed as improvements upon 'St. Joseph.' One, which he has just named 'St. Antoine de Padoue,' fairly promises to be a valuable

addition to the already pretty long list of the perpetual large Strawberries.

M. Edouard Lefort, the reputed raiser of some good varieties, has already entered the lists with 'Jeanne d'Arc,' a seedling from 'St. Joseph,' which, although decidedly different from the mother plant in its rounder, greener leaves and brighter scarlet fruit, does not show such an advance as to deserve a lengthy description. Fresh achievements in perpetual Strawberries are to be expected yearly now, and some respite should be given to the raisers in order to let them thoroughly test their new productions before bringing them forward. Similar kinds which follow too soon upon the appearance of a sensational novelty are very apt to turn out to be nothing more than misnomers and masqueraded duplicates of the original article. So every able judge will pronounce the so-called 'Rubicunda, la Constante féconde' to be with regard to 'St. Joseph.'

It is quite otherwise with 'Oregon' and another French sort, 'Louis Gautier.' Both are distinct, and, although far from perfect, deserve to be noticed and experimented with.

'Oregon' was distributed as far back as 1894 or 1895 by Mr. Crawford, of Cuyahoga Falls, Ohio, as a *Perpetual* Strawberry, and it really deserves the name to a great extent. I have seen it recently bearing a fair crop of large, bright scarlet, sharply angular berries, and showing fresh trusses of bloom which promise another crop of fruit before winter. My opinion is that it is heavily handicapped in the contest with 'St. Joseph' by the fact of its being a weak grower and a scanty bearer of runners; but it is after all a fairly perpetual sort.

'Louis Gautier,' on the other hand, is a vigorous and luxuriant grower, with a dark, thick, hairy foliage: the trusses are very strong, growing well out of the leaves, with large coxcombed fruit as pale as the original Chili Strawberry. It gives, according to my experience of it, a heavy crop in spring of ill-coloured, large white-fleshed, quite solid, juicy fruit, but bears only few and far between summer or autumn trusses of bloom. These, when produced at all, mostly spring from the young plants rooted in spring from the earlier runners. A fresh flower-stem from even a young plant which has already bloomed in spring is, to my knowledge, a rarity.

It is certain that new varieties of perpetual large-fruited

Strawberries will now be produced in great numbers, some of which may deserve to be hailed as valuable discoveries. We must be content to wait for them to appear, and in the meantime turn the few already established sorts to the best possible account, which can be done most successfully with some care and management. The best system, to the extent of my experience, consists in preventing the perpetual varieties from flowering and bearing fruit in May, when they cannot compete anything like successfully with the fine single-cropping sorts, suppressing the runners all the time, and in manuring, mulching, and watering freely from July to the end of September.

The use of the perpetual Strawberries for forcing I am not acquainted with, and therefore I will abstain from treading on unexplored ground.

But I will add a last remark to the effect that I have observed an imperfectly perpetual Strawberry found in the district of Angers to bear fruit much more abundantly since the 'St. Joseph' Strawberry has been introduced into my garden at Verrières. It seems evident that the flowers borne out of season by the former, which I suppose to be a chance seedling from the old Pine-apple Strawberry, mostly failed to set for lack of impregnation, and now are regularly pollinised in consequence of the 'St. Joseph' Strawberry bearing a profusion of perfect stamens nearly all the year round.

The new race should then prove doubly useful in bearing fruit constantly and in helping to impregnate the ovaries of other varieties.

THE DISA GRANDIFLORA.

By Mr. F. W. BIRKINSHAW.

[Read September 6, 1898.]

THIS interesting cool Orchid is one of my special favourites, and I may say that I have grown it with very fair success. In some seasons of course it has flowered much better than in others, according to the strength of the annual growth which it makes.

There are, I believe, upwards of fifty species of *Disa*, chiefly natives of the Table Mountain and the Mascarenhas Islands; but I am sorry to say that not half of them are cultivated in European gardens at the present day. I do not know why this

is so, but I have heard Orchid growers say how very difficult Disas are to manage. However, I have not found them so; but of course the position in which they are placed is very important to their growth.

My remarks will refer chiefly to *Disa grandiflora*, or, as it is sometimes called, the 'Flower of the Gods,' which is the largest flowered variety in the genus. The flowers are of a brilliant carmine red, and in some the hooded sepals are suffused with orange. There is a variety named 'Superba,' which is quite a deep blood-red, and when seen under artificial light it is most attractive.

This beautiful class of terrestrial Orchids should, I think, be included in even the most select collections. The amateur may try a few plants, as they do not require any expensive glass structures or heating apparatus. In a cool greenhouse, where Pelargoniums or hard-wooded plants flourish, there will the Disa be at home if properly attended to. The plants that I have charge of are arranged at the east end of a cool greenhouse some twenty yards in length, and partially shaded from the afternoon sun by a 10 ft. wall. The house is about sixty yards away from the boilers, so that there is very little pipe heat at any time. The plants are elevated a few inches above the front ventilators, on sandstone slabs, covered over with sand and spar. There is a duplicate stage underneath filled with gas-coke broken small, so as to absorb all moisture, and give it off again during the nights. In warm weather it is kept watered, so as to keep the plants cool and moist. I often put cabbage and lettuce leaves down among the plants on a hot day, and they have appeared to wither up; but on visiting them again about 8 P.M. they have looked quite fresh and green again, and covered with moisture, the slugs taking their repast from them instead of making a supper off the Disas.

VENTILATION.

Being an alpine or mountain plant the Disa delights in abundance of fresh air, without a draught. Even in winter it is most beneficial, as it strengthens the young growths, and makes them all the more vigorous to withstand the summer heat. If only a chink of air is given for two or three hours a day, just to change the temperature of the house, it will do them a great deal

of good, coming as they do from high altitudes, where fresh air is constant and pure both day and night. As evidence of the hardiness of this Orchid, during the severe winter of 1894 I remember on several occasions finding in the early morning 1 deg. and 2 deg. of frost in the house, the soil in the pots quite crusted over, and the young growths black and drooping; but a sprinkling of cold water from a fine rose-can or syringe soon restored the plants to their proper colour and firmness, care being also taken not to let the sun shine on them for several days. The boiler that was working the houses then was a little beneath its work, consequently the Disa house only got a small share of heat. But in that same year there were over forty spikes of bloom, and some of the spikes had seven, eight, and nine flowers upon them, proving that the low temperature did not affect them in the least.

Many times from December to February the house opens at 35 deg. Some growers are quite alarmed if the thermometer falls below 48 deg. at night. But I am told that on the Table Mountain frost is very prevalent, and I have found out from experience that a little will not do them any harm, providing the rhizome does not get frozen through, as it is of a fleshy nature, and would soon perish.

TREATMENT WHEN IN BLOOM.

The usual time for Disas to flower is in June and July. I have had them out by the first week of the latter month, and exhibited them at our local show the last day in August by keeping them shaded from the sun, and in as cool a place as possible.

This shows what a most useful Orchid it is, as it lasts so long, and comes into bloom at a time of the year when most of the Orchidaceous plants are over, and are making their new pseudo-bulbs for another season's work.

If arranged with such things as *Eulalias*, *Cyperus natalensis*, and Ferns, some on the staging and others elevated on pots, the effect, when they are in bloom, is most lovely; and when a whole group is seen in this way, it is a sight not easily forgotten. When fully expanded they require keeping a little drier, both at the roots and in the atmosphere; but when the flowers are in the bud state a slight spraying over once a day is most beneficial to

them. For vases and table decorations, arranged with light grasses and ferns, they are very effective, as also in hand bouquets; and they last for a long time when cut.

THE RESTING PERIOD.

All the Orchid family take a rest at some period of the year, many of them when the pseudo-bulbs have finished growing. But the *Disa* has a short rest before it commences its new growth. It can scarcely be perceived, for when the old growths are quite gone the new ones will be an inch or so in height; but when the foliage is seen to put on a yellow tinge, they want to be kept a little dry, but not dust-dry, as in their native home they will get heavy dews at night; so, to imitate their natural conditions, I usually syringe them late in the afternoons, or draw the lights off for an hour or so when it is raining gently.

POTTING THE PLANTS.

I have repotted them in November, December, and January, but I find the most suitable time to be the latter end of September or the beginning of October, as the fleshy roots have not then got so far advanced in growth as to be injured in the potting process. My mode is to top-dress and look to drainage one year, and the next year to repot them, having perfectly clean pots and crocks, as this is very important, for the *Disa*'s roots will not work in anything that is dirty or sour. I have tried the perforated pans for them, but find they are not at all suitable, as they dry up too quickly during hot weather; and not only that, but the young growths are very awkward to get out of the holes at potting time without breaking them off. They are also favourable to the wood-lice, as they can enter the holes, and so make their way readily to the roots, which they are so fond of. So having tried both sorts of pots, I much prefer the ordinary ones without side-holes.

CROCKING THE POTS.

This should be done with great care. Instead of placing the crocks flat side down, I find it is better to arrange them on their ends, as the roots delight to ramble down between them without turning in a horizontal direction, as they must do when the crocks have been laid flatways. After crocking place a thin

layer of sphagnum moss on the top to keep the soil from choking the drainage. If the water cannot pass away quickly, the plants will soon show an unhealthy appearance, the tips of the leaves damping off. When this is seen they should be shaken out forthwith and replaced with clean potting material, for if left any length of time the tubers will decay.

THE POTTING COMPOST

should consist of three parts spongy peat with bracken fern roots in it, such as is obtained from any rough moorland. It should be pulled into small pieces, with a little turfy loam added with plenty of fibre in it, and a little decomposed cow manure which has been thoroughly baked to kill all insect life. These ingredients should be passed through a half-inch sieve to take the small out, using only that which does not go through, and putting among it plenty of coarse sand, lumps of sandstone and charcoal, and mixing all well together.

Carefully knock the plants out of their pots, damaging the roots as little as possible. Some growers pot them quite flat, and I have tried it myself, but I find that by elevating them a little above the pot's rim they seem to do much better, and are not so liable to damp off at the collar, the water leaving them more quickly. A thin wooden label is very useful in working the new soil round the plant, finishing off with a little sphagnum and small pieces of sandstone.

After potting take back to the winter quarters, giving them a good watering with tepid water through a fine rose; they will not then require any more for several days, only to be kept moist by the syringe. The one I use is Stott's patent, which discharges water almost like dew falling on them. They will require watering at the roots as well if they appear to be dry, which is ascertained by the sphagnum turning a light colour. Tapping the pots with the knuckles, as is done with other plants, is no use, for having extra drainage and being potted rather lightly they would sound hollow, perhaps, when quite saturated. When the sun is at all hot and shining on them they will require shading. Roller blinds are the best: they can be drawn up when it is at all dull or cloudy. Disas like to be near the glass, and to receive abundance of light at all times.

About February the roots will be working in the new com-

post, when they will want more water at the roots, as well as over the foliage. Twice a day will do them no harm, according to the state of the weather.

March, April, and May they will take copious supplies. In the latter month, if about 1 oz. of guano is dissolved to a gallon of aired water, and given them once a week, they will derive much benefit from it.

The principal insects which attack the plants are red spider, green and black fly, which get down the centre of the young growths, and if not eradicated will soon cripple the young shoots. I used to lay the plants on their sides and syringe the fly out with a little soft soap and water, as tobacco smoke disfigured the young leaves at the tips. But now I use that gardener's friend called "XL All," a vaporiser that will kill the fly on the first application without injuring the most delicate foliage, provided that it is quite dry at the time of fumigation.

Slugs are also very fond of Disas, and would soon ruin the plants if not looked for in the evening. Some shell snails also are very troublesome, boring holes through the tender leaves, and being so very small they are difficult to find.

About the middle or the latter end of May, if it begins to be very hot, I remove the plants out of the house into a cold frame on the north side, bringing them back to flower, as in the frame the spikes would be too near the glass, and could not be so easily inspected as in a house. During the time they are in the frames, if the lights are drawn off now and again during gentle showers of rain, it will do them a great deal of good. Rain-water is the best to water them with if it can be got.

The lights should be well tilted up at all times, so that they can have plenty of air. If a little is left on all night, when the weather is favourable, the growths will be all the more robust.

HYBRIDISATION.

I am quite sure there is a large field for the hybridist to work up new varieties belonging to this Alpine genus. Messrs. Veitch have already given us several new ones, for which we are greatly indebted to them, such as *Disa Langleyensis*, the result of *Disa racemosa* crossed with *D. tripetaloides*. Also the most beautiful *Disa Veitchii*, a hybrid between *Disa grandiflora* and *D. racemosa*. The sepals are of a bright carmine, with the

inner portion of the lip almost white, spotted with crimson. It is a great acquisition, and much easier to grow than its parents. *Disa grandiflora* crossed with *D. Veitchii* has also given us the lovely *D. Diores* and *D. Diores*, var. '*Clio*' (fig. 75), which deservedly received an Award of Merit at the last meeting of this Society. (See page clxiii.)

When the flowers of any *Disa* have been successfully cross-fertilised, it is soon seen by the flower beginning at once to droop and close, and in the course of a few days the pod will begin to

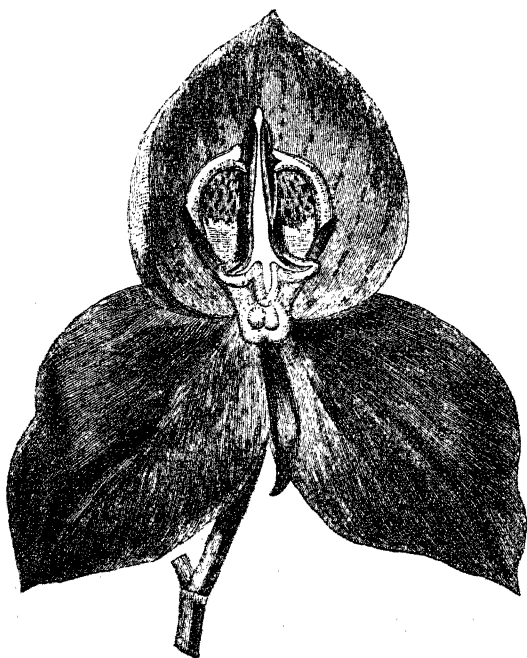


FIG. 75.—*DISA DIORES*, var. '*CLIO*.' (*Journal of Horticulture*.)

swell with rapidity. About the middle of September the seed will be getting ripe, and will require watching daily, for as soon as the seed-pod opens and looks at all brown it will be quite time to cut it off, placing it in a box on a sunny shelf for a few days until it has parted with its contents. The seed will then be ready for sowing at once, as no Orchid seeds improve by keeping, but quickly lose vitality.

SOWING THE SEED.

I do not think it a good plan to sow it on its own pot, as the abundance of water which the Disas require would wash away all the seed, which is only like so much snuff. My method is to get an ordinary seed-pan, put in sufficient drainage to keep the soil sweet, place some of the roughest peat on the crocks to keep the drainage open, then fill in with more peat and lumps of sandstone, imitating a miniature rockery, and give it a good watering with hot water to kill any insects that may be lurking in the soil. The seed should then be scattered evenly over the surface, covering very slightly with a little sand and dusty peat; put through a very fine sieve, give it a gentle watering to settle the seed, place a bell-glass over the pan, and put it in a temperature of about 55 deg. at night. The seed should be shaded at all times when the sun is on the house, and the compost must be kept fairly moist. The seedlings will begin to appear from two to three months after sowing. They seem to germinate best near to the lumps of sandstone. I have even seen them on the top without a particle of soil near them. I have a nice potful of seedlings, about three years old, some of them with four and five leaves on each. I sowed another pan last year (1897), and about eighty seedlings have already germinated. These will remain in the seed-pan until they are two years old; then they will be pricked out round the sides of 5-inch pots, using a rougher compost than was used in sowing the seed. My practice is to let them grow in this way for a year; then put them into thumb-pots, plunging them in a large pan of cocoanut fibre or sphagnum, so as to keep the roots cool and moist. When they have got well rooted in the thumbs they may be transferred into a little larger pot, and so on as they require it. They may show a spike of bloom in the fifth or sixth year, according to the strength of the growth. It seems a long time to wait, but nevertheless it is most interesting to watch the tiny blade of grass (as it looks) when it first appears until the flowering stage is reached, when there may be one or two plants flower in the batch, which will repay the cultivator for all the trouble and care bestowed on them. The best varieties are easily detected by being of a deep red colour near the base of the annual growth. The majority of them are of lighter colour, and the flowers from these will be a little washy in colour and not so refined. In purchasing established

plants it is best to select those with dark bases to the shoots, as from these good varieties are sure to result.

That most lovely hybrid *Disa kewensis* which was exhibited in Sir F. Wigan's beautiful group of Orchids at the last Temple Show came in for a good share of admiration from all interested in cool Orchids.

DEALING WITH IMPORTED PLANTS.

Like most Orchids, Disas can be purchased at the auction-room for a trifling sum ; but it is far better to buy established plants at some reliable nursery, as they are not so easily managed when just imported as some other Orchids coming from warmer regions are. When they are imported from their native home, they require putting into pans with peat, broken crocks, and a little sphagnum and coarse sand. They should be placed in a house with a night temperature of about 45 deg. ; syringing them now and again until growth is well advanced, when they will require more water at the roots.

PROPAGATION.

In nearly all the family of Orchidaceous plants there is a method of increasing them, either by aerial growths or cutting the pseudo-bulbs in pieces. The latter is the best way to increase the *Disa*. At the potting time take a small piece off with a little bit of rhizome to it ; place it in a 3-inch pot, using the same potting material as before ; and in a year's time it will be ready for a size larger pot. Offsets made thus increase very fast, especially if the soil and climatic conditions are suitable to them.

SUBURBAN FRUIT-GROWING.

By Mr. ROUPELL, F.R.H.S., Hon. Sec. of the Brixton, Streatham, and Clapham Horticultural Society.

[Read September 20, 1898.]

THE following remarks are intended to apply to the environs of all large cities and towns in Great Britain and Ireland, and the area of Greater London, with its population of six millions, is taken as a type and example.

Fruit-growing in the suburbs of London is no new thing. From time immemorial market gardeners have grown their fruit and vegetables, and taken them to market, bringing back in their carts and vans manure obtained at a cheap rate in the town. The distances to be covered fifty years ago were comparatively small, and growers made a pleasant and comfortable living by the cultivation and sale of Grapes, Plums, Apples, and bush fruit, in addition to vegetables, all of which brought good prices. The land was not over-drained, and in some cases it was marshy and waterlogged. Ponds and ditches were in many instances the sources of their water supply for horticultural purposes; but in those days we did not suffer so much in dry weather from lack of moisture as we do now that there is no reserve stored up in the subsoil.

The main drainage of London, though necessary from a sanitary point of view, has greatly lessened the fertility of the soil. In the first place, it has carried to the sea incalculable wealth in the shape of organic matter, which was formerly available for the fertilisation of the land. Houses were then drained into cesspools; the night-waggon was a familiar institution in the town; hardy farm labourers cheerfully engaged in the most offensive tasks for the sake of a little addition to their wages and privileges; and Mother Earth, the great deodoriser, received back her due. But now she is robbed and starved or cheated with stable litter, which differs greatly from the old farmyard manure; or she is insufficiently fed with artificial manures, some of which are of but little value.

In the second place, the main drainage of London has intercepted all the springs and rivulets which previously found their way from the beautiful hills which surround London to the valley of the Thames, and the blessed raindrops which Heaven distils are bound by Act of Parliament to hurry from the roofs of palaces and cottages alike through the same foul pipes which carry the diluted sewage to the sea. It is within my knowledge and recollection that the eminent engineer Robert Stevenson the younger and others, who professionally approved the main draining scheme, regarded it as a necessary first step which would eventually have to be followed by a system of separation. This is not a cheerful prospect for the ratepayer, but the question will have to be faced, as Nature will inevitably call the

inhabitants of London to a strict account for their wanton waste of the vast wealth of organic matter which is now sent down to the river's mouth to feed or poison the fishes.

One has only to look at the standard trees in the suburban gardens to see how rapidly they are failing. The tops are dying—an ominous sign. And this is true also of the forest trees in Kensington Gardens and some of the public parks, especially where the subsoil is gravel.

I have touched upon this branch of the subject because one of the first necessities in fruit-growing is a copious supply of water. My friends often ask why their out-of-door Peaches fall off every year when they are about the size of hazel nuts, and on examination at the foot of the wall the subsoil is always found to be as dry and hard as bath brick.

When the old Suburban Gardens were first laid out the soil was generally fresh and in good condition, for as building extended meadows and market gardens were absorbed, and fruit trees throve in the freshly broken ground enclosed within the garden walls; but of late years the speculative builder has converted the light soil into mortar for building purposes, and the new gardens consist generally of clay and rubbish fenced in with oak palings. The fine old gardens of Dulwich, Tulse Hill, Streatham, Putney, and other suburbs still remain, but the surface soil is generally exhausted, sour, and full of fungoid germs. To buy fresh soil in quantity would now be an enormous expense, and the question is, What should be done to restore fertility to the soil?

I am afraid that the art of trenching is in danger of being lost in the suburbs of London. Nearly all young gardeners want to get into the glass houses and amongst the flower pots. The first tool put into the hands of a young gardener should be a spade, and if he do not begin to use it in early years he will never have the muscles or the inclination to use it manfully. If you want trenching done properly you must look about for some old labourers to do it. Of course, a good deal depends upon the subsoil, and I do not advocate the bringing up to the surface a quantity of gravel or stiff clay. But a portion of the latter material may with advantage be turned up, and when dressed with lime and exposed to the frost it will soon break down and admit of being incorporated with the rest of the soil. Where it can be done some clay should be burnt or charred and worked in with

the rest. All lime and brick rubble should be saved. The ashes of rubbish heaps, soot, sweepings of the poultry yard, dovecote, and stable, refuse from the kitchen, weeds, and leaves should be collected and spread over the ground to be turned into the bottom of the trench, so as to be buried with the stale and exhausted soil from the surface.

When the trenching is completed the surface should be heavily dressed with quicklime and be left rough for the winter. In the following spring a liberal dressing of quarter-inch bones or coarse bone meal should be lightly forked in and a green crop, say of tares, raised, which might with advantage be dug in to freshen and enrich the soil. The land would then be fit for planting with fruit trees in the following autumn. Stable litter—I will not call it manure—is of but little value except as a mulch in dry or frosty weather. This should be spread round the trees after planting, and when there is a good crop a surface dressing of any good manure, consisting mainly of phosphates and potash rather than nitrates, should be sown. The trees will require to be watered in dry hot weather, as the roots, if planted properly, are near the surface.

I have tried planting maiden trees, but whether pruned the first year or the second I have never been able to make such good bushes or pyramids as those obtained from the nurseries under the description of "Two-year-olds, with some fruit spurs."

With respect to pruning it has been humorously said that "there are two sets of fools—those who prune too much and those who don't prune at all." I have found it better to be cautious in the use of the pruning-knife after the foundation of the tree has been laid, and to confine pruning to thinning out objectionable shoots rather than to shortening them back. Summer is to be preferred to winter pruning, as the wounds heal over more quickly and leave less opportunity to canker germs and American blight to effect a lodgment.

Summer pinching has its uses, but bushes pinched into stunted growth can never be got out of it. I prefer a more natural system.

CORDONS.

These succeed for a time, and some varieties of fruit give wonderfully fine specimens from them. This is especially

true of Bismarck Apple. The chief use I make of upright Cordons on the Paradise and Quince is to form half-standards, a form that has been named 'Amateur's Trees,' and which have been well described in the *Gardeners' Chronicle* by Mr. Waltham.

The advantage of this form is that the fruit is kept well above the ground instead of lodging upon it, as often happens with bush trees. It is interesting to see how the scions of some varieties of Apple infuse vigour into the Paradise stock, and compel it to support a standard tree.

The Blenheim Orange, Newton Wonder, Smart's Prince Arthur, Beauty of Kent, Peasgood's Nonesuch, Warner's King, and several other Apples have this effect, whilst Pitmaston Duchess and some other Pears similarly affect the Quince stock.

Fruit should be cultivated and suitably manured as a crop. Proper quarters should be set apart for the trees, and tall growing vegetables should not be planted between them. Apples and Pears on the free stock are better avoided, except when they are wanted for ornament or shelter, instead of forest trees. If standards are desired they may be raised from Cordons on the Paradise stocks, as before described.

If fruit trees grow too vigorously and bear no fruit, lift them and re-plant; or if too big, cut a trench a few feet from the stem and prune the roots. This should be done in the autumn, half the circle one year and half the next; but old trees whose roots have travelled to a distance will not bear this treatment.

It is curious to note how obstinately certain errors with respect to fruit are held by the public. For instance, it is generally believed that the Ribston Pippin is dying out as an old and exhausted variety. Now, in the first place, it is not an old variety, for the original tree died only in 1835; and, in the second, it is not exhausted, for at the present time there are more Ribston Pippin trees in a healthy condition than at any previous period in my recollection. They may be had in thousands on the Paradise stock, perfectly free from canker; but if people will plant them on the crab stock in unsuitable soil they must take the consequences. There are as many Ribston Pippins as ever there were, but there are many more mouths to eat them.

There are certain Apples which are referred to in Shakespeare's plays that are of unknown antiquity, and yet they are still with us.

Thus, in the play of *Henry IV. Part II.*, act ii, scene 4, the first drawer says: "What hast thou brought there? Apple Johns? Thou knowest Sir John Falstaff cannot endure an Apple John."

Second Drawer: "Mass! Thou sayest true. The Prince once set a dish of Apple Johns before him and told him there were five more Sir Johns, and, putting off his hat, said, 'I will now take my leave of these six dry, round, old, withered knights.'"

And in the same play Davy says, "There is a dish of Leathercoats for you," no doubt meaning the Leather Coat Russet. Then, again, Shallow is made to say, "Nay! you shall see mine orchard, where in an arbour we will eat a last year's Pippin of my own graffin, with a dish of Carraways," no doubt meaning Carraway Russets.

In the *Merry Wives of Windsor* Evans says, "I pray you, begone! I will make an end of my dinner. There's Pippins and cheese to come."

It was only the other day that an old lady picked up an Apple in my garden, and said, "May I keep it? I am so fond of a sharp Apple with cheese."

And in the play of *Romeo and Juliet* Mercutio says, "Thy wit is a very bitter sweeting—it is a most sharp sauce!" And Romeo replies, "And is it not well served to a sweet goose?"

Many of you have doubtless often heard of good old John Parkinson, the author of "Paradisus." From an edition of this work, published in 1629, I have made the following extract. He says, in his quaint old English:—

"The Paradise or dwarf-apple groweth nothing so high as other sorts, and many times not much higher than a man may reach. The fruit is a fair yellow apple, but very light and spongy, and of a bitterish-sweet taste—nothing pleasant. To recompense this fault, whatever other sort of apple shall be grafted on it will be kept low and like unto itself, and bear fruit reasonable well."

He goes on to say that "the Golding Pippin is the best of

all sorts of Pippins, but I know of no sort of Pippins but are excellent, good, well-relished fruits. The 'Flower of Kent' is a fair yellowish green apple, both good and great. The Gilloflower is a fine apple. The Grey Costerd is a good, great apple, and abideth the winter. The Queening Apple is of two sorts, both of them great, fair, red apples, and well relished, but the greater is the best. The Leathercoat Apple is a good winter apple, but of no great bigness. The Catshead takes the name of the likeness, and is a reasonable good apple and great. There are twenty sorts of Sweeting, and none of them good." There is one other Apple in Parkinson's list, described by him as "a very pleasant and good apple," and that is the "Geneting"—still our best-flavoured first early Apple, now known as Juneating or Red Margaret.

So much for old sorts dying out.

I do not think many of my hearers could tell me the origin of the word "pomatum."

Old Parkinson says: "There is a fine sweet ointment made of apples, which is much used to help chapped lips or hands, or for the face, or other part of the skin that is rough with the wind, to supple them and make them smooth, and the name of the ointment is Pomatum, from the Latin word *pomum*."

In the cider districts of Somerset some old rhymes contain, as they often do, the experience of ages. They say:—

If apples blow in March,
For apples you may search;
If apples blow in April,
Apples will be plentiful;
But if apples blow in May,
You may eat apples night and day.

THE SETTING OF HARDY FRUIT BLOSSOM.

There is much difference of opinion upon this subject amongst writers upon fruit culture, but I do not think fruit growers vary very much in their ideas upon the matter. I think the general opinion amongst them is that frost is the chief agent in determining the question of a good fruit crop or a bad, and I noticed that this year we had a week of very inclement weather, whilst the Pear trees were in bloom, followed by a very bad crop, and that when the Apple trees were in blossom the weather was showery for a week without a single frost in my district, and

that an exceptionally good set of Apples followed. The question of shelter is therefore a very important one, and there is nothing so injurious to fruit blossom as frost accompanied by a dry, cutting wind. In all the gardens that I have visited, the Pears, where there are any, are all on the sheltered side of the tree, away from the north-east wind; and whether the wood be well ripened or not the question of good crop or bad depends, in my opinion, mainly upon the condition of the weather when the trees are in bloom.

An error prevails that the R.H.S. has increased the evil of too many varieties of Apples and Pears by granting certificates to a great many new sorts. This is not the case. The Society rarely grants a certificate for a new Apple or Pear, and then only when the variety is a real acquisition. In fact the R.H.S. is the only body that has done anything to remedy the evil of too many sorts. The Apple Congress held at Chiswick in 1888 under the auspices of the R.H.S. was the first considerable attempt made to deal with the evil. All the known and unknown varieties of the Apple that could be brought together were there, and an immense number were marked as third-rate or worthless. Many varieties so called were proved to be the same Apples under different names. Some had as many as thirteen or fourteen. Much of the evil has arisen in the cider districts, where many trees raised from pips have been allowed to stand without being grafted, as their fruit could be used for cider-making, and having received a local name they have got included in the list of Apples. It must not be forgotten, however, that many of our best Apples were chance seedlings obtained in this way.

In the matter of fruit the taste of the public has changed very much. Formerly a small crisp Apple, suitable for dessert, such as the Golden Pippin, the Nonpareils, Golden Knob, &c., was in favour. High colour was thought to indicate inferior quality, and it is only of late years that highly coloured Apples have come into favour. It was thought that British Apples were inferior in colour to American varieties, but a glance at the fruit exhibited to-day will convince every one that our Apples are not deficient in this respect. The populations of the large cities and towns have greater purchasing power than was formerly the case, and fresh fruit is largely consumed as an article of diet by the masses instead of being considered a luxury.

Much that I have stated about Apples will be also applicable to Pears. The Quince takes the place of the Paradise stock, with the result that Bush and Pyramid Pears are produced instead of the timber-like trees with which we are all familiar. The Quince is, in a sense, intermediate between the Apple and the Pear, and both can be grafted upon it, so that Pears and Apples may be seen growing upon the same tree. It has, however, greater affinity to the Pear than to the Apple, and all who wish to have Pears should purchase Pyramids or Cordons on the Quince stock.

Pears are more truly a luxury than Apples. Our climate is not so well suited to them, and they are more uncertain. The difficulty of keeping Pears after they are ripe affects their value, but there are certain kinds that are less perishable than others, and some of the popular Pears are good bearers and sell freely. A good deal of judgment and skill is required in gathering and storing this fruit. Some varieties require to be kept in a warm place to ripen them, and others are apt to shrivel if exposed to the air and light. A proper fruit-room should be dark, not too dry, and of even temperature. Fruit is often gathered before it is fit, because of the autumn gales, but on Pyramid and bush trees the fruit may be allowed to hang longer.

The gardens of our nobility and gentry have in the past been the schools for high culture, and we owe much to those who have maintained them in so public-spirited a manner. But of late years the greatest advance has been made by the growers of fruit for market. They have taught us how to cover the land with glass at a marvellously cheap rate, and by combining the culture of Grapes and Tomatos, they have added enormously to our supplies. Our open ports invite the foreigner to send us the products of sunnier skies; but still British products maintain their superior character, and we may with the aid of cheap glass structures defy competition.

The Grapes and Tomatos grown in London suburbs and in the neighbourhood of Worthing fetch the highest prices, and I have no doubt but that in the near future Strawberries will be produced under glass at a cheap rate before the French growers can supply them, and that means will be taken to prolong the season. The taste of the public has a tendency to become more fastidious as supplies increase; and whilst there

is a craving for cheapness there is also a dissatisfaction with inferior quality, and a desire and willingness to pay for something better. The cheap foreign products go year by year to a lower stratum of society, and the upper strata are always asking for higher quality. For example, the middle and upper classes show a decided preference for the high-class smooth Tomatos of moderate size, and the old, corrugated, and over-sized varieties find their way to the coster's barrow.

And this leads me to say that the advance made in the cultivation of Tomatos and the raising of improved varieties have entitled this beautiful and wholesome product to be elevated to the dignity of a fruit. Messrs. Sutton & Sons and other growers have presented us with dessert varieties, which are being consumed in enormous quantities in a raw state, and I frequently hear it said, in answer to the question, "Do you want the Tomatos for cooking?" "Oh no; they are far too good for that!" Why, it would be more reasonable to call some varieties of Melon vegetables than Tomatos of this fruit-like character. For I am inclined to think that some inferior Melons would be improved by cooking.

Let me also put in a plea for the more delicate varieties of Grape. Londoners are too apt to taste with their eyes, and during the festive season, go where you will, nothing but Gros Colmar and Black Alicante Grapes meets your eyes at dessert. I give credit to the growers for their great skill and enterprise, but I should like to see some Grapes in the market suitable for invalids. It is one of my greatest pleasures to supply the sick and suffering with fruit that they can really enjoy, and a Grape with a thin skin and juicy texture will often bring a smile to the face even of the dying. The "Diamond Traube," "Duke of Buccleuch," "Black Hamburgh" properly ripened, and "West St. Peter's" are to be recommended for this purpose.

We are indebted to our French friends for a delightful addition to the fruits suitable for invalids. The so-called Perpetual Strawberries are likely to effect a revolution in Strawberry growing, not so much by what they are as by what they will probably become when crossed with our largest and best varieties. Last week I was privileged to see these Strawberries growing in the gardens of Gunnersbury House, the residence of Mr. Leopold de Rothschild, and I was greatly surprised to find the crop of Strawberries

there far in advance of anything of the kind I had previously seen. The air was perfumed with their delightful fragrance, and the fruit was thrown well above the leaves on the old plants, whilst the runners, not yet detached from the parent plants, were commencing to fruit in pots in the open air. Even runners from these were showing blossom. The name of the variety is 'St. Joseph.'

Mr. Hudson, the eminent gardener at this establishment, in a letter to the *Standard*, thus describes his mode of culture:—

"The culture of the Alpine Strawberry is of the simplest description. Seedling plants are infinitely better than those obtained from runners. The old plan of propagation by runners did nothing to increase its popularity, rather otherwise. Plants raised from runners lack in a remarkable degree the vigorous constitution of seedlings, whilst they are not so fertile, nor so continuous in bearing fruit. The seed may be sown in a cold frame in April, or in the open ground in May, similar to hardy annuals, a moist, cool, shaded spot being chosen. The seedlings should be transplanted once or twice, being finally put out into beds eighteen inches from plant to plant, October being the best month for this purpose. These plants if well attended to will commence to bear fruit in June following, being as early as the best known of the early kinds of the ordinary Strawberry, but with continuous cropping qualities until the middle of October, covering a period of four months. The season may be further extended until the end of October, if ordinary garden frames be placed over them, whilst under more favourable climatic conditions the season can be further prolonged. When the fruit is all [picked the plants can be destroyed, or a portion of them, those remaining being kept for the first crop another season, these being again succeeded by seedling plants, which in that case can have their first flower spikes cut off, so as to further strengthen the plants. The runners, which are produced freely, should be cut off too. Almost any soil, but preferably a light one, will suit them. This Strawberry delights in moisture, and a moderate amount of shade; hence spots not suited to other fruits may be utilised for this."

The Raspberry also can be grown to great advantage in the suburbs of London, as it is not adapted to bear long journeys, and the new variety, 'Superlative,' is strongly recommended.

GOOSEBERRIES

have the good quality of being useful both in their ripe and un-ripe state. The method of growing them in fan shape, as recently exhibited by Messrs. Veitch, offers many advantages. It is easier to protect the fruit and to gather it when the bushes are thus trained. A cool, moist situation suits them best.

Currants, red, white, and black, will, like Gooseberries, thrive under the shade of other trees, and all surplus fruit can readily be preserved for winter use.

Cherries can rarely be ripened out of doors except when protected by netting, as blackbirds, thrushes, and starlings cannot otherwise be kept from them in London. Cherries grown in a cool orchard house are, as many of you know, most delicious, and they can then be kept safe from birds. They are worthy of this protection, and the good qualities of some varieties can only be brought out when ripened under glass.

Peaches, Nectarines, and Apricots ripen well on south walls in the suburbs of London. They require copious supplies of water, especially after the stoning period, and the roots should be frequently lifted to keep the trees in fruitful condition. Heavy crops may be relied on under glass.

There are not many sorts of Plum that fruit regularly in London soil. The 'Victoria' is an exception, but much may be done to increase fertility by mixing lime with the soil and occasionally lifting the roots. The Plum resents the use of the knife and thrives best in firm ground.

To have the choicest plums in perfection they should be grown in pots under glass, and they are then most delicious. Some very fine exhibits are shown to-day, and to these I beg to draw your attention. Those exhibited by Mr. Leopold de Rothschild are especially fine, and when I saw them last week all the trees were covered with fine fruit, and they presented a charming sight.

Figs ripen well in most parts of London when trained on walls, but two crops in the year may be relied upon when grown under glass.

The Mulberry is a good town tree, and thrives round London. It should be planted on a lawn, so that the fruit may fall upon grass. Mulberries freshly gathered are very welcome in hot weather, especially to an invalid.

BLACKBERRIES.

The best of these is indigenous to the Surrey hills, and ripens its fruit well in shady positions.

I refer to 'Laciniatus.' This variety ripens early, bears abundantly, and is very delicious. I prefer it to any of the American varieties, for which it is sometimes mistaken, but it springs spontaneously from the loam brought from Walton Heath, and it is locally known as the 'Norwood Blackberry.' It delights in partial shade, and many waste spots might be rendered profitable by planting them with this variety of Blackberry.

[In replying to a vote of thanks, Mr. Roupell mentioned the confusion existing in the naming of Apples and Pears, and as an example he referred to 'Yellow Ingestrie' Apple, which he said was often called 'Summer Golden Pippin.' The fruit of the two was remarkably similar in appearance, but the flesh of 'Summer Golden Pippin' was by far the better quality, and their growth was quite distinct, the 'Golden Pippin' being very bushy and stocky wood, whereas 'Yellow Ingestrie' made long thin growths.]

"HANDBOOK OF INSECTS

"Injurious to Orchard and Bush Fruits, with Means of Prevention and Remedy." By Eleanor A. Ormerod. Simpkin, Marshall, & Co., London.

Miss Ormerod's last book fully maintains the high standard of excellence which marks all her previous work. It is a handbook in more than name, for it ought never to be far from the hand of any grower of fruit.

Where every insect that infests our fruit crops is so exhaustively dealt with, it is perhaps invidious to mention any in particular. The articles on the Black Currant Mite, the Plum Aphis, the Winter Moth, and the Eel-worm will appeal to most fruit-growers, and the mention of them serves to show the wide scope of the book. We could have wished for a table of contents at the beginning, but with this one trifling exception the book could hardly be improved. It is a book to be universally recommended and studied.

REPORT ON CANNAS AT CHISWICK, 1898.

A COLLECTION of seventy-one new and old varieties of Cannas, together with many unnamed seedlings raised in the Gardens, were grown at Chiswick. Two plants of each were flowered in 10-in. pots in an unheated greenhouse. The plants made good growth and flowered profusely from the early part of July to the middle of October, and were greatly admired. They were started in cocoanut fibre in March in a brisk heat, and when large enough were divided and transferred to 4-in. pots and planted in turfy loam to which had been added a quantity of leaf-mould and sharp silver-sand to keep the whole porous. Later on the plants were moved to the flowering pots and placed in a cool house. It is very important that Cannas should have perfect drainage, and during the growing season copious supplies of water should be given to the roots. Cannas are well adapted for subtropical bedding, but the Italia group are not suitable for this purpose. Those belonging to the Italia group are conspicuous for their tall habit, handsome foliage, and gorgeously coloured flowers, which, however, are of shorter duration than those of the Crozy group. The collection was examined by the Floral Committee on several occasions.

F.C.C. = First-class Certificate.

A.M. = Award of Merit.

× × × = Highly Commended.

I.—GREEN-LEAVED VARIETIES.

1. Admiral Courbet, **F.C.C.** August 28, 1888 (Vilmorin).—Spike tall and slender; flowers of medium size, with long petals, bright canary-yellow, spotted with crimson.

2. Ajax (Veitch).—Dwarf habit; not very free flowering; flowers lemon-yellow, streaked with rosy crimson, the centre segment being striped with deep crimson.

3. Alemannia, **A.M.** July 27, 1898 (Dammann and Veitch).—Very large leaves; flowers large and handsome, with a broad Cattleya-like lip, orange scarlet and deep red, with an irregular golden-yellow margin.

4. Alphonse Bouvier, **A.M.** January 12, 1892 (Lemoine).—

Tall, stout spike; very free flowering; flowers large, drooping, rich crimson scarlet.

5. Antoine Barton, $\times \times \times$ June 20, 1894 (Paul).—Compact habit; flowers rich yellow, heavily spotted and streaked with crimson.

6. Austria (Dammann & Veitch).—Dwarf sturdy habit; flowers lovely canary-yellow, the centre segment faintly striped with crimson.

7. Bavaria (Veitch).—Tall spike; flowers deep golden yellow, mottled and blotched with brownish red; lip dull red streaked with yellow.

8. Britannia (Veitch).—Similar to No. 3.

9. Burgundia (Veitch).—Slender habit, with large spikes of Cattleya-like flowers, canary-yellow spotted and stained with blood-red; lip heavily spotted and suffused with orange.

10. Charles Henderson (Paul).—Dwarf habit; free flowering; flowers rich crimson, borne in dense trusses.

11. Charles Naudin (Dammann).—This made poor growth and failed to flower.

12. Cheshunt Yellow, **A.M.** April 24, 1894 (Paul).—Dwarf habit; flowers rather small but abundantly produced, canary-yellow with light yellow shadings, lower segment orange scarlet.

13. Comte de Bouchard, **A.M.** May 26, 1897 (Paul).—Sturdy habit; flowers borne freely on stout spikes, clear yellow spotted with crimson.

14. Comtesse de Estoile (Paul).—Slender spike; medium-sized flowers, deep yellow, spotted and splashed with brown.

15. Comtesse de Sartoux Thorence, $\times \times \times$ August 16, 1898 (Vilmorin).—Very dwarf habit; very free flowering; flowers large, deep golden yellow, heavily mottled and striped with brown and crimson. This is the best of the spotted yellow flowered Cannas, and proved to be the most continuous bloomer in the Chiswick collection.

16. C. Conquerant (Veitch).—Dwarf habit; free flowering; flowers large, rich apricot colour, with deeper shadings. Very distinct and handsome.

17. Doyen Jean Leopold, **A.M.** July 27, 1897 (Vilmorin).—Dwarf habit; flowers large and well formed, golden yellow, mottled with dull red.

18. Edward Mieg, **A.M.** July 27, 1897 (Vilmorin).—Dwarf

compact habit; very free flowering; flowers large, crimson scarlet touched with orange.

19. Else Bofinger (Pfitzer).—Tall spike; flowers of medium size, pale yellow, spotted with brown.

20. Florence Vaughan (Vilmorin).—Flowers yellow, spotted with brownish crimson, similar to No. 45.

21. Franz Buchner (Veitch).—Dwarf habit; free flowering; flowers borne on stout spikes, terra-cotta shaded with orange, and irregularly bordered with golden yellow.

22. Frau Anna Buchner (Pfitzer).—Compact habit; flowers large, yellow spotted with brown.

23. Frau Philip Tiesmayer (Pfitzer).—Dwarf habit; flowers large, borne on stout spikes; colour vermilion. Very fine.

24. Gardeninspector Massias (Pfitzer).—Sturdy habit; free flowering; flowers scarlet shading to orange and irregularly bordered with deep yellow.

25. G. W. Uhler (Pfitzer).—Dwarf habit; moderately free flowering; flowers bright scarlet deeply edged with yellow.

26. Heria (Dammann).—Tall habit; very free flowering; flowers large rich yellow, the central portion of each segment is blotched with blood-red.

27. Heinrich Seidel (Dammann & Veitch).—Tall habit; flowers large and handsome, rich yellow blotched and spotted with crimson-purple, lip crimson edged with yellow.

28. Hofgartendirector Lauche, **A.M.** July 27, 1898 (Pfitzer).—Dwarf compact habit; flowers produced in great trusses, orange-scarlet mottled with yellow and margined with gold.

29. Hofgartendirector Wendland, $\times \times \times$ July 27, 1898 (Pfitzer).—Medium height; flowers large and of good form, intense crimson margined with pale yellow.

30. Italia, **A.M.** June 23, 1896 (Dammann & Veitch).—Compact habit; flowers very large, blood-red, deeply edged with golden-yellow. Very beautiful,

31. Kaiser William II. (Pfitzer).—Dwarf habit; flowers rather small, orange-scarlet shaded with vermilion.

32. Königin Charlotte, **A.M.** August 8, 1893 (Pfitzer).—Dwarf habit; very free flowering; flowers rich scarlet irregularly bordered with deep yellow. Very showy.

33. L. E. Bally, **A.M.** April 10, 1894 (Paul & Veitch).—Dwarf habit; free flowering; flowers large and of great substance, canary-yellow spotted with carmine.

34. Madame Crozy, **A.M.** May 28, 1890 (Herbst).—Compact sturdy habit; exceptionally free flowering; flowers large and well-formed, rich scarlet margined with yellow.

35. Marcus Michelli (Veitch).—Sturdy habit; flowers large, scarlet with crimson shadings, irregularly bordered with yellow. An improvement on Madame Crozy.

36. Mrs. Fairman Rogers (Veitch).—Very dwarf sturdy habit; small leaves and compact spikes of large rosy scarlet flowers margined with rich yellow; the base of each segment is blotched with yellow. A free and continuous bloomer.

37. Mrs. Tasker (Paul).—Dwarf habit; flowers rather small, orange-yellow, suffused and streaked with crimson.

38. M. François Gos (Vilmorin).—Flowers rich orange of good form and substance. Shy bloomer.

39. Papa (Vilmorin).—Very dwarf compact habit with large spikes of slightly drooping rich orange scarlet flowers.

40. Partenope, **A.M.** August 16, 1898 (Dammann & Veitch). Tall habit; flowers very large rich orange, irregularly bordered with a deeper shade.

41. Paul Bruant (Paul).—Slender habit; tall spike; flowers clear scarlet.

42. Paul Sigrist (Veitch & Paul).—Flowers rich orange-scarlet, shaded with vermilion and edged with yellow.

43. Perseus (Veitch).—Tall habit; very free flowering; flowers very large and of good form, rich yellow; lip stained with blood-red, and the upper central petal blotched with a lighter shade.

44. Professor Treub (Dammann).—Did not flower.

45. Progression, **A.M.** April 11, 1893 (Paul).—Tall free growth; free flowering; flowers rich yellow spotted with brown.

46. Reichskanzler Fürst Hohenlohe, $\times \times \times$ July 27, 1898 (Veitch).—Dwarf habit; flowers of medium size and good form, lemon-yellow lined and shaded with clear buttercup-yellow; lip mottled with red.

47. Sophie Buchner, **A.M.** May 9, 1893 (Paul).—Dwarf habit; very free flowering; flowers clear vermilion. Very distinct.

48. Souvenir de Antoine Crozy (Vilmorin).—Tall habit; flowers sparsely produced on slender spikes, crimson margined with pale yellow.

49. Souvenir de F. Gaulin (Paul).—Poor grower; flowers produced on slender spikes, small, freely spotted and streaked with red. An inferior variety.

50. Suevia (Dammann).—Did not flower.

51. T. D. Eisele (Pfitzer).—Dwarf compact habit; flowers very large, deep crimson suffused with orange-scarlet. A free and continuous bloomer.

52. William Marshall, **A.M.** August 16, 1898 (R.H.S.).—An improved and dwarfer form of No. 3.

53. William (Pfitzer).—Dwarf compact habit; flowers clear scarlet, borne very freely.

II.—DARK-LEAVED VARIETIES.

54. Abricote (Vilmorin).—Medium height; free flowering; flowers bright orange with deeper shadings.

55. Africa (Veitch).—Tall habit; flowers large; petals broad, rich orange, feathered with orange-scarlet.

56. America, **A.M.** July 27, 1897 (Dammann & Veitch).—Tall habit; moderately free flowering; flowers very large, rich orange with deeper shadings and margined with bright red.

57. Corsaire, **A.M.** July 27, 1897 (Vilmorin).—Medium height; free flowering; flowers large deep orange scarlet.

58. Edouard André (Dammann & Veitch).—Tall habit; very free flowering; immense flowers, rich orange-scarlet, shaded with purple, and irregularly margined with crimson. Very fine.

59. Egandale (Vilmorin).—Free flowering; flowers large and well formed, deep crimson, shading to rosy purple with age.

60. Hofgartendirector Graebener (Pfitzer).—Tall habit; flowers of medium size, scarlet, mottled with crimson.

61. J. D. Cabos (Lemoine).—Tall habit; moderately free flowering; flowers rich reddish apricot, borne on slender spikes.

62. La France, $\times \times \times$ July 27, 1898 (Veitch).—Medium height; flowers large and of good form, orange-scarlet, mottled with a pale shade of the same colour.

63. Mrs. F. Eckstein (Pfitzer).—Tall habit; free flowering; flowers very large lovely orange-yellow, borne on very stout spikes.

64. Pandora (Veitch).—Tall habit; flowers large bright orange-scarlet, shaded with rose towards the base of the petals.

65. Paul Bert (Veitch).—Medium height; spike tall and slender; flowers of medium size, bright scarlet.

66. Pluto (Veitch).—Dwarf sturdy habit; moderately free flowering; flowers large and handsome, orange-scarlet, mottled with yellow towards the base of the segments.

67. President Faure (Vilmorin).—Tall habit; slender spike with small scarlet-crimson flowers. Shy bloomer.

68. Semaphore (Vilmorin).—Medium height; flowers bright orange-scarlet.

69. Souvenir de President Carnot (Vilmorin & Veitch).—Tall habit; flowers clear scarlet borne on stout spikes.

70. Stadtrat Heidenreicht, A.M. August 16, 1898 (Pfitzer).—Dwarf compact habit; very free flowering; flowers large crimson-scarlet.

71. Stadtgartner Schmoger (Pfitzer).—Tall habit; flowers deep orange, feathered with scarlet.

REPORT ON ZONAL PELARGONIUMS AT CHISWICK, 1897-98.

A collection of 293 varieties of Pelargoniums was received at the Society's Gardens in the spring of 1897. Four plants of each variety were grown—two in pots for winter flowering and two in beds in the open air. Those planted outside did fairly well, but the flowers of those indoors were so much damaged by fogs that it was decided to continue the trial in 1898. This year, fogs being less prevalent, the plants were more satisfactory, but the long drought greatly interfered with the proper development of those outside. The silver, gold, bronze, and yellow-leaved varieties were grown out of doors only, and those of the green-leaved varieties that did well outside are shown by an asterisk (*). The plants were examined by the Floral Committee on several occasions.

F.C.C.=First-class Certificate.

A.M.=Award of Merit.

× × ×=Highly Commended.

TRICOLOUR SECTION.

I.—LEAVES MARGINED WITH CREAMY-WHITE, DISTINCT ZONE.

1. Charming Bride (Cannell).—Dwarf compact habit; flowers deep scarlet. Very effective.

2. Dolly Varden, $\times \times \times$ July 31, 1890 (Cannell).—Compact bushy habit; leaves roundish with a bright red zone; distinct and handsome; flowers bright scarlet. Stands drought well.

3. Empress of India, **F.C.C.** May 2, 1877 (Cannell).—Vigorous habit; leaves roundish with bright red zone; flowers small, bright scarlet. Very effective.

4. Eva Fish (Cannell).—Dwarf habit; leaves large round with a red zone; flowers scarlet.

5. Lass o' Gowrie, **F.C.C.** July 7, 1868 (Cannell).—Similar to No. 6.

6. Miss Farren (Cannell).—Very compact bushy habit; leaves roundish with a broad red zone; very effective; flowers small, bright scarlet.

7. Mrs. Clutton (Cannell).—Vigorous habit; leaves broadly zoned; flowers small, bright scarlet.

II.—LEAVES MARGINED WITH GOLDEN-YELLOW,
DISTINCT ZONE.

8. Adam Bass (Cannell).—Similar to No. 11, but of dwarfer habit.

9. Enchantress (Cannell).—Similar to No. 12.

10. Lady Cullum (Cannell).—Compact habit; leaves flat with a broad dark zone; flowers scarlet.

11. Masterpiece, $\times \times \times$ August 19, 1897 (Cannell).—A vigorous growing form of No. 12.

12. Mrs. Pollock, **F.C.C.** August 21, 1867 (Cannell).—This old and well-known variety is still one of the best of its class.

13. Mrs. Turner, **F.C.C.**, August 29, 1874 (Cannell).—Compact habit; leaves rather flat, with a broad richly coloured zone; flowers rich crimson.

14. Peter Grieve, **F.C.C.** 1873 (Cannell).—Vigorous habit; leaves large and richly coloured. Very showy.

15. Prince of Wales, **F.C.C.** July 7, 1868 (Cannell).—Similar to No. 12.

16. Sir R. Napier, **F.C.C.** July 7, 1868 (Cannell).—Compact

habit; leaves large with a broad dark zone shaded with red; primrose-yellow margins; flowers salmon-pink running to blush towards the edges of the petals.

17. *Sophie Dumaresque*, **F.C.C.** Sept. 4, 1866 (Cannell).—Tall, vigorous habit; leaves large, flat, with a broad purple-red zone; flowers bright scarlet. Very effective.

18. *Mr. H. Cox*, **F.C.C.** July 8, 1879 (Cannell).—Similar to No. 12, but less vigorous in growth.

19. *William Sandy* (Cannell).—An inferior form of No. 12.

III.—LEAVES VARIEGATED WITH SILVER.

20. *Boule de Neige*, $\times \times \times$ August 19, 1897 (Cannell).—Compact bushy habit and very free growing; leaves large and of good form, deeply margined with white; flowers scarlet.

21. *Chelsea Gem* (Cannell).—Dwarf compact habit; leaves irregularly margined and streaked with white.

22. *Flower of Spring*, **F.C.C.** April 12, 1860 (Cannell).—Dwarf spreading habit; leaves round and beautifully variegated with cream white; flowers rosy-scarlet borne in great trusses.

23. *Lady Rosebery* (Cannell).—Very dwarf weak habit; flowers semi-double, small, crimson-scarlet, borne in small trusses.

24. *Little Trot* (Cannell).—Very dwarf bushy compact habit; leaves round with broad pure white margins; flowers bright scarlet.

25. *Mary Anderson* (Cannell).—Dwarf sturdy habit; flowers semi-double, pale magenta.

26. *Miss Gertrude* (Cannell).—Rather weak habit; flowers soft pink with a white eye, borne in good-sized trusses and thrown well above the foliage.

27. *Miss Kingsbury*, $\times \times \times$ August 19, 1897 (Cannell).—Compact bushy habit; very free growing; flowers orange-scarlet. One of the best of its class.

28. *Mrs. J. C. Mappin* (Cannell).—Dwarf compact habit; very free flowering; flowers white with a pink eye. A showy bedder.

29. *Mrs. Parker* (Cannell).—Bushy habit; free growing; flowers double rose-pink.

30. *Princess Henry of Battenberg* (Cannell).—Dwarf habit; flowers double, pure white. Not a success outside.

31. Viscountess Cranbrook (Cannell).—A dwarf form of No. 20.

32. White Clipper, **F.C.C.** May 7, 1873 (Cannell).—Very compact habit and of free growth; flowers large, round, white, suffused with pink.

IV.—LEAVES BRONZE.

33. Bronze Corinne (Cannell).—Rather weak dwarf habit; leaves round with a light brown zone; flowers double, dazzling scarlet.

34. Golden Harry Hieover, **F.C.C.** 1873 (Cannell).—Compact bushy habit; narrow dark-brown zone; flowers scarlet.

35. Her Majesty (Cannell).—Vigorous compact habit; broad light brown zone; flowers bright scarlet.

36. Jubilee (Cannell).—Similar to No. 33.

37. Maréchal MacMahon, $\times \times \times$ August 19, 1897 (Cannell).—Vigorous compact habit; deep brownish red zone; flowers bright scarlet.

38. Zulu, $\times \times \times$ August 19, 1897 (Cannell).—Vigorous bushy habit with distinct richly coloured zone.

V.—YELLOW-LEAVED VARIETIES.

39. Creed's Seedling, $\times \times \times$ August 19, 1897 (Cannell).—Very dwarf compact habit; leaves greenish-yellow; flowers bright scarlet borne on long stems.

40. Robert Fish (Cannell).—Very dwarf neat habit; leaves pale yellow; flowers orange-scarlet.

40A. Verona (Cannell).—Similar to No. 39.

GREEN-LEAVED VARIETIES.

VI.—FLOWERS SINGLE WHITE.

41.* Albion, $\times \times \times$ August 19, 1897 (Cannell).—Flowers pure white borne in large trusses; very free flowering; habit dwarf and compact; leaves pale green, slightly zoned.

42. Alsace-Lorraine (Lemoine).—Flowers milky white; free flowering; vigorous habit; leaves slightly zoned.

43.* Amy Amphlet (R.H.S.).—Flowers white touched with pink; free flowering; vigorous spreading habit; leaves deeply zoned.

44. Dr. Nansen (Marshall).—Flowers large pure white borne in great trusses; compact habit; leaves slightly zoned.

45. Duchess of York (Marshall, Cannell).—Flowers large with round well-formed petals borne on stout stems; free flowering; leaves slightly zoned.

46. Lily (Marshall).—Flowers of medium size; rather shy flowering; leaves slightly zoned.

47. La Perle (Lemoine).—Flowers white suffused with pink; moderately free flowering; vigorous habit; leaves slightly zoned.

48.* Madame Roechlin Schwartz, $\times \times \times$ August 19, 1897 (Lemoine).—Flowers large, white, borne in compact trusses; free flowering; leaves slightly zoned.

49. Niagara, $\times \times \times$ October 22, 1897, as a winter bloomer (Cannell).—Flowers large, pure white with round petals; very free flowering; compact habit; leaves slightly zoned. A better form than No. 45.

50.* Ramsgate White Bedder (Cannell).—Flowers white; very free flowering; compact bushy habit; leaves plain green, slightly zoned.

51.* Snowdrop (Pearson).—Flowers large, pure white, borne in medium-sized trusses; compact habit; leaves indistinctly zoned.

52. Virginia (Cannell).—Similar to No. 51.

53.* White Distinction (Cannell).—Flowers suffused with delicate pink; free flowering; vigorous habit; leaves deep green, broadly zoned.

VII.—FLOWERS DOUBLE WHITE.

54.* Advancer, $\times \times \times$ August 19, 1897 (R.H.S.).—Flowers very double, borne on stout stalks in large trusses; compact bushy habit; leaves slightly zoned.

55.* Boule de Neige, $\times \times \times$ August 19, 1897 (R.H.S.).—Flowers cream white; free flowering; spreading habit; leaves faintly zoned.

56. Hermine (Cannell).—Flowers semi-double pure white; very free flowering; compact habit; leaves slightly zoned.

57. La Favourite, $\times \times \times$ August 30, 1898 (Marshall).—Flowers pure white, produced in great trusses; very free flowering; compact bushy habit; leaves slightly zoned. The

Floral Committee consider the variety named White Abbey, sent by Messrs. Cannell, to be synonymous with La Favourite.

58. Madame Braudes (R.H.S.).—Flowers shaded with pink. The habit is similar to No. 59.

59.* Mont Blanc (Lemoine).—Flowers pure white, borne in immense trusses; compact bushy habit; leaves slightly zoned.

60. The Pearl (Cannell).—Flowers large, not very free flowering; compact habit; leaves slightly zoned.

61. White Abbey (Cannell).—See No. 57.

VIII.—FLOWERS SINGLE, PINK AND ROSE-PINK.

62.* Beckwith's Pink (Cannell).—Flowers clear pink, the base of the upper petals blotched with white; free flowering; robust habit; leaves large, plain green.

63.* Catulle Mendes (R.H.S.).—Flowers purplish pink; free flowering; dwarf sturdy habit; leaves plain green.

64.* Countess of Buckingham (Cannell).—Flowers rose pink, paler towards the centre; very free flowering; dwarf compact habit; leaves plain green.

65. Delicata, F.C.C. July 16, 1868 (Cannell).—Flowers large and well formed, borne in large trusses; very free flowering; habit dwarf and bushy; leaves slightly zoned.

66. Duchess of Devonshire (Cannell).—Flowers pink; rather shy flowering; vigorous habit; leaves slightly zoned. Inferior to No. 77.

67. Edith Brooks (Brooks).—Flowers large, bright rose pink; free flowering; vigorous bushy habit; leaves deeply zoned.

68. Edith George (Cannell).—Flowers small, borne in good-sized trusses, pink shaded with rose; rather shy flowering; leaves plain green.

69. Eurydice, F.C.C. June 11, 1862 (Marshall).—Flowers small, with round petals; free flowering; diffuse habit; leaves slightly zoned.

70.* Hetty (R.H.S.).—Flowers bright rose pink; very free flowering; habit dwarf and compact; leaves plain green.

71. Jules Moineaux (Lemoine).—Flowers borne in large trusses, pink running to white towards the centre; poor habit; leaves large and broadly zoned.

72. Lady Grey (Holford).—Flowers large and well formed,

borne in great trusses, pale pink; very free flowering; vigorous bushy habit; leaves slightly zoned.

73. La Lorraine (Lemoine).—Flowers borne freely, lilac pink; bushy, compact habit; leaves slightly zoned.

74. Lilacina (Cannell).—Flowers borne in large trusses; petals large and round, deep pink; very free flowering; bushy habit; leaves plain green.

75. Lilian, $\times \times$ Oct. 22, 1897, as a winter bloomer (Holford).—Flowers large and handsome, borne on stout stalks well above the foliage, colour clear pink; vigorous habit; leaves heavily zoned.

76. Maud of Wales (Cannell).—Flowers large, rich pink, rather shy flowering; compact habit; leaves slightly zoned.

77. Miss Joliffe, $\times \times \times$ Oct. 22, 1897, as a winter bloomer (Brooks).—Flowers large and well formed, soft pink; very free flowering; vigorous free grower; leaves distinctly zoned.

78.* Mrs. French (Cannell).—Flowers large; borne in immense trusses on stout stalks well above the foliage, colour bright pink; very free flowering; vigorous bushy habit; leaves slightly zoned.

79.* Mrs. Holden, F.C.C. July 14, 1876 (R.H.S.).—Flowers small, very bright pink; free flowering; habit spreading and compact; leaves plain green.

80.* Mons. Poirier, $\times \times \times$ July 31, 1890 (Lemoine).—Flowers pinkish magenta shaded with blue; very free flowering; vigorous compact habit; leaves large, broadly zoned.

81. Pink Domino (Marshall).—Flowers large and of good form, borne in very fine trusses; clear pink; free flowering; bushy compact habit; leaves slightly zoned.

82. Sally Prudhomme (R.H.S.).—Flowers rose pink; not very free flowering; dwarf bushy habit; leaves slightly zoned.

83.* Stella Massey (R.H.S.).—Flowers pale pink touched with lilac; free flowering; bushy habit; leaves slightly zoned.

84.* Trophee (R.H.S.).—Flowers pale pink; moderately free flowering; compact habit; leaves slightly zoned.

IX.—FLOWERS DOUBLE PINK.

85. Alexandre (Lemoine).—Flowers semi-double, deep rose pink; free flowering; habit dwarf and compact; leaves plain green.

86. Antigone (Lemoine).—Flowers pale pink, shaded with salmon; diffuse habit; leaves slightly zoned.

87.* Armand Silvestre (R.H.S.).—Flowers pink touched with magenta; free flowering; dwarf spreading habit; leaves slightly zoned.

88. Camille Bernardin (Cannell).—Flowers pink shaded with rose; very free flowering; bushy compact habit; leaves slightly zoned.

89. Dr. Roux (Lemoine).—Flowers pink; shy flowering; diffuse habit; leaves plain green.

90. Double Pink (Barr).—Flowers bright pink; free flowering; vigorous dense habit; leaves deeply zoned.

91.* Erasme (R.H.S.).—Flowers very bright pink; vigorous sturdy habit; leaves distinctly zoned.

92. Gone Coon (Cannell).—Flowers deep pink; free flowering; compact bushy habit; leaves faintly zoned.

93. Henri Chabrilat (Lemoine).—Flowers pale pink with deeper shadings; moderately free flowering; vigorous habit; leaves slightly zoned.

94.* Henri Houssaye (Lemoine).—Flowers deep rose pink, free flowering; habit dwarf and compact; leaves slightly zoned.

95. Jeanne Canoot (Cannell).—Flowers pale pink; very free flowering; habit dwarf and spreading; leaves round, plain green.

96. Lady E. Peel (Cannell).—Flowers rose pink; shy flowering; dwarf weak habit; leaves slightly zoned.

97. L. Contable (Cannell).—Flowers rose-pink; free flowering; compact bushy habit; leaves faintly zoned.

98. Léon Xandorf (Cannell).—Flowers pink; moderately free flowering; dwarf spreading habit; leaves slightly zoned.

99.* Lord Derby, F.C.C., May 21, 1867 (Marshall, Cannell).—Flowers large, bright rose-pink; very free flowering; bushy compact habit; leaves very slightly zoned.

100.* Madame Barny, x x x August 19, 1897 (Cannell).—Flowers rose-pink, borne in great trusses; vigorous habit; leaves plain green.

101. M. Caro (Cannell).—Flowers pale pink; very free flowering; vigorous habit; leaves plain green.

102. Pasteur (Lemoine).—Flowers salmon-pink; moderately free flowering; weak habit; leaves slightly zoned.

103. Pyd Stanislas (Lemoine).—Flowers borne in immense trusses; colour pale pink; free flowering; vigorous bushy habit; leaves very slightly zoned.

104. Rosa Bonheur (Cannell).—Flowers large, borne in great trusses, bright rose-pink, showy and distinct; vigorous habit; leaves heavily zoned.

105. Sendresse (R.H.S.).—Flowers pale pink; free flowering; bushy spreading habit; leaves faintly zoned.

X.—FLOWERS MAGENTA, DOUBLE.

106. Annibal (Lemoine).—Flowers shaded with pink; very free flowering; spreading habit; leaves plain green.

107. A. Ronillard (Lemoine).—Flowers borne in very large trusses, magenta blotched with orange scarlet; free flowering; vigorous habit; leaves plain green.

108. Duc de Montmartre (Cannell).—Flowers borne in large clusters, light magenta; very free flowering; vigorous bushy habit; leaves slightly zoned.

109. G. Caillebotte (Cannell).—Flowers deep magenta; free flowering; vigorous habit; leaves slightly zoned.

110. Gerome (Cannell).—Flowers suffused with pink; very free flowering; spreading habit; leaves faintly zoned.

111. Lohengrin (Lemoine).—Flowers shaded with pink; weak habit; leaves plain green.

112. Madame de la Rue (Cannell).—Flowers rosy magenta; dwarf compact habit; leaves plain green.

113. Ruber (Lemoine).—Flowers purplish magenta, small trusses; vigorous habit; leaves plain green.

114. Sacher Massock (R.H.S.).—Flowers pale magenta; dwarf spreading habit; leaves very faintly zoned.

115.* Sir Hamilton, × × × August 19, 1897 (Cannell).—Flowers borne in great trusses, magenta shaded with purple; bushy sturdy habit; leaves plain green.

XI.—FLOWERS SINGLE PURPLE.

116. Alice Brooks (Brooks).—Flowers borne in medium-sized trusses; rosy purple suffused with scarlet; moderately free flowering; straggling habit; leaves slightly zoned.

117. Bluebeard (Marshall).—Flowers rich purple, blotched

with scarlet at the base of the upper petals; very free flowering; leaves plain green.

118. *Britannia* (Cannell).—Flowers borne in large trusses, the upper petals shaded with scarlet; loose straggling habit; leaves plain green.

119. *Dr. Tucker* (Marshall).—Flowers borne in small trusses, blotched with scarlet at the base of the upper petals, and shaded with crimson towards the margins; moderately free flowering; leaves plain green.

120. *Eugene* (Lemoine).—Flowers blotched with scarlet at the base of the upper petals; free flowering; diffuse habit; leaves plain green.

121. *Iris* (Pearson).—Flowers large and well formed; magenta purple; very free flowering; dwarf spreading habit; leaves plain green.

122. *Majestic* (Cannell).—Flowers large and of good form, borne in great trusses; upper petals shaded with crimson scarlet; light eye; loose straggling habit; leaves plain green.

123. *Marquis of Dufferin* (Cannell).—Flowers of medium size; upper petals shaded with crimson scarlet, lower ones running to purplish crimson towards the edges; vigorous habit; leaves plain green.

124. *Ryecroft Purple* (Cannell).—Flowers borne in large trusses, rich purple, blotched with scarlet at the base of the upper petal; very free flowering; vigorous sturdy habit; leaves broadly zoned.

XII.—FLOWERS DOUBLE PURPLE.

125. *Aglaia*, **F.C.C.** July 7, 1872 (Cannell).—Flowers borne in large trusses thrown well above the foliage, shaded with scarlet; very free flowering; dwarf compact habit; leaves slightly zoned.

126. *Cæsar*, **F.C.C.** June 27, 1871 (Lemoine).—Flowers purplish magenta; moderately free flowering; vigorous habit; leaves slightly zoned.

127. *Edison* (Cannell).—Flowers borne in large trusses shaded with crimson scarlet; very free flowering; weak habit; leaves distinctly zoned.

128. *General Billot* (Cannell).—Flowers suffused with scarlet; free flowering; vigorous habit; leaves broadly zoned.

129. La Fayette, F.C.C. August 21, 1877 (Lemoine).—Flowers borne in large trusses shaded with scarlet; free flowering; vigorous bushy habit; leaves slightly zoned.

XIII.—FLOWERS SINGLE SALMON.

130. Birthday (Cannell).—Flowers large and well formed, borne in very fine trusses; very pale salmon; moderately free flowering; vigorous habit; leaves distinctly zoned.

131. Beatrice Brooks (Brooks).—Flowers large, borne in handsome trusses on stiff stalks well above the foliage; pale salmon, lighter towards the edges of the petals; very vigorous habit; leaves deeply zoned.

132. Camille Saint Saens (Cannell).—Flowers bright salmon, paler towards the edges of the petals; dwarf bushy habit; leaves slightly zoned.

133. Cassiope (Pearson).—Flowers large, shaded with pink; free flowering; vigorous habit; leaves distinctly zoned.

134. Countess of Derby (Cannell).—Flowers salmon, shading to deeper salmon towards the centre, the edges of the petals touched with flesh-colour; leaves zoned.

135. Duchess of Marlborough (Cannell).—Flowers pale salmon, with a lighter shade towards the margins; moderately free flowering; vigorous habit; leaves slightly zoned.

136. Dr. Crozat (Lemoine).—Flowers rich salmon, paler towards the edges of the petals; free flowering; compact bushy habit; leaves slightly zoned.

137.* Edith Strachan (R.H.S.).—Very free flowering; vigorous compact habit; leaves broadly zoned.

138. Figaro (Lemoine).—Flowers salmon, streaked with white; very free flowering; vigorous spreading habit; leaves distinctly zoned.

139. Good Friday (Cannell).—Flowers salmon pink, shaded with magenta; lax habit; leaves slightly zoned.

140. Hilda (Pearson).—Flowers large, of good form, borne in great trusses and thrown well above the foliage; salmon, shaded with pink; leaves distinctly zoned.

141. Iseult (Pearson).—Flowers large, borne in very large trusses; salmon; shaded with rose; leaves heavily zoned.

142. J. H. Arderne (Cannell).—Flowers pale salmon, lighter

towards the edges of the petals; vigorous habit; leaves broadly zoned.

143. Joseph Blake (Brooks).—Flowers borne in large trusses, very bright salmon touched with scarlet; bushy compact habit; leaves distinctly zoned.

144. Lady Brooke (Cannell).—Flowers pale salmon, with a blush-coloured centre; free flowering; weak habit; leaves distinctly zoned.

145. Magnificent (Cannell).—Flowers deep salmon, shaded with orange; moderately free flowering; compact habit; leaves deeply zoned.

146. Mrs. E. G. Hill (Cannell).—Flowers borne in medium-sized trusses, pale salmon; vigorous habit; leaves slightly zoned.

147. Mrs. Hall (Cannell).—Flowers large and of good form; moderate free flowering; vigorous habit; leaves slightly zoned.

148. Mrs. Mayes (Cannell).—Flowers soft salmon; moderately free flowering; vigorous habit; leaves distinctly zoned.

149.* Mrs. Norman (Cannell).—Flowers borne in great trusses, salmon-pink; very free flowering; rather weak habit; leaves slightly zoned.

150.* Mrs. Robert Cannell (Cannell).—Flowers large and well formed, borne on stout stalks well above the foliage; salmon shaded with rose; free flowering; habit dwarf and compact; leaves broadly zoned.

151. Mrs. Bariff (Marshall).—Flowers shaded with rose; shy flowering; weak habit; leaves slightly zoned.

152. Nellie Brooks (Brooks).—Flowers bright salmon; very free flowering; habit dwarf and compact; leaves heavily zoned.

153. New Star (Cannell).—Flowers pale salmon with a deeper centre; shy flowering; compact habit; leaves slightly zoned.

154. Phyllis (Pearson).—Flowers very large, of good form, borne in great trusses; very free flowering; bushy compact habit; leaves plain green.

155. Pierre Ducharte (Lemoine).—Flowers borne in large trusses, deep salmon, becoming lighter towards the edges of the petals; vigorous habit; leaves plain green.

156. Princess Alix (Marshall, Pearson).—Flowers very large salmon rose; free flowering; compact bushy habit; leaves slightly zoned.

157. *Salmon King* (Brooks).—Flowers deep salmon, margined with white; moderately free flowering; bushy spreading habit; leaves distinctly zoned.

158. *Souvenir de Mirande*, **A.M.** May 30, 1889 (R.H.S.).—Flowers pale salmon, shaded with blush towards the centre; free flowering; vigorous habit; leaves very faintly zoned.

159. *St. Cecilia* (Pearson).—Flowers borne in handsome trusses, salmon, shaded with rose towards the centre; free flowering; vigorous bushy habit; leaves slightly zoned.

160.* *Surprise* (Cannell).—Flowers salmon, shading to flesh colour; free flowering; dwarf bushy compact habit; leaves broadly zoned.

161. *Tiresias* (Lemoine).—Flowers pale salmon; weak habit; leaves slightly zoned.

162. *Valkyrie* (Cannell).—Flowers large, borne in great trusses, rich salmon, shading to blush-white towards the edges of the petals; free flowering; compact sturdy habit; leaves heavily zoned.

163. *Victor Fournell* (Cannell).—Flowers large and showy, salmon suffused with rose; vigorous bushy habit; leaves slightly zoned.

164. *W. H. D'Ombraïn*, $\times \times \times$ October 4, 1897, as a winter bloomer (Marshall, Pearson).—Flowers produced in exceptionally large trusses, rich salmon, shading to blush-pink; compact sturdy habit; leaves distinctly zoned.

165. *Wilhelmina* (Cannell).—Flowers shaded with orange; vigorous bushy habit; leaves slightly zoned.

XIV.—FLOWERS SINGLE, SALMON-RED.

166. *Aurore Boréale* (Cannell).—Flowers salmon-scarlet; moderately free flowering; sturdy habit; leaves large, slightly zoned.

167. *Crabbe* (Pearson).—Flowers borne in great trusses, large and of great substance; bright salmon-red; free flowering; bushy spreading habit; leaves faintly zoned.

168. *Winkfield Gem* (Cannell).—Flowers borne in large trusses, large and of good form, deep salmon-red; free flowering; spreading habit; leaves plain green.

XV.—FLOWERS DOUBLE SALMON.

169. Beauté Poitivienne (Cannell).—Flowers large, borne in great trusses, clear salmon; vigorous grower; leaves heavily zoned.

170. Cousin Belle (Cannell).—Flowers very pale salmon, shaded with flesh colour; compact bushy habit; leaves heavily zoned.

171.* Danbray (R.H.S.).—Flowers bright salmon-red; very free flowering; vigorous habit; leaves deeply zoned.

172. Dr. Mergaut (Cannell).—Flowers shaded with rose; rather shy flowering; vigorous habit; leaves faintly zoned.

173. Gloire de France (Marshall).—Flowers borne in large clusters, deep salmon, shading to blush-pink and edged with rose; moderately free flowering; compact sturdy habit; leaves heavily zoned.

174. Joyful (Cannell).—An improvement on 173.

175. Lady Candahar (Cannell).—Flowers borne in very large trusses, rich salmon; free flowering; bushy compact habit; leaves heavily zoned.

176. Lord Tennyson (Cannell).—Flowers deep salmon touched with rose and flaked with white; compact bushy habit; leaves distinctly zoned.

177. Madame Charlotte (Cannell).—Flowers pale salmon; moderately free flowering; compact bushy habit; leaves deeply zoned.

178. Madame Jouis (Cannell).—An improvement on 173.

179. Madame Wettstein (Cannell).—Flowers reddish-salmon mottled with white and faintly edged with rose-pink; rather shy flowering; vigorous habit; leaves deeply zoned.

180. M. Presse (Cannell).—Flowers salmon-pink edged with rose; vigorous habit; leaves distinctly zoned.

181. Mathias Sandorf (Cannell).—Flowers borne in large trusses, rich salmon-red; very free flowering; bushy spreading habit; leaves plain green.

182. Maggie Hallock (Cannell).—Flowers borne in small trusses, clear salmon; rather shy flowering; vigorous habit; leaves heavily zoned.

183. Miss Floss (Cannell).—Flowers salmon rose shaded with pink; very free flowering; compact bushy habit; leaves slightly zoned.

184. Mrs. Gladstone (Cannell).—Flowers pale salmon; moderately free flowering; spreading habit; leaves slightly zoned.

185. Nydia (Cannell).—Flowers borne in large trusses, pale salmon with a deeper centre; free flowering; bushy compact habit; leaves distinctly zoned.

186. Rainbow (Cannell).—Flowers salmon-red touched with purple; very free flowering; compact spreading habit; leaves heavily zoned.

187. Renommée Nancienne (Cannell).—Flowers semi-double shaded with rose-pink; moderately free flowering; vigorous habit; leaves plain green.

188. Violet Daniels (Cannell).—Flowers borne in medium-sized trusses; deep salmon; rather shy flowering; diffuse habit; leaves slightly zoned.

XVI.—FLOWERS SINGLE, SCARLET AND ORANGE-SCARLET.

189. Arthur Brooks (Brooks).—Flowers of good size and shape, bright scarlet shaded with rose-pink; free flowering; compact bushy habit; leaves plain green.

190. A. Tennyson (Pearson).—Flowers scarlet touched with rose; moderately free flowering; bushy spreading habit; leaves plain green.

191. Aurea perfecta (Cannell).—Flowers borne in rather small trusses, scarlet; shy flowering; diffuse habit; leaves slightly zoned.

192. Brilliant (Cannell).—Flowers borne in handsome trusses; bright scarlet; vigorous habit; leaves slightly zoned.

193.* Cannell's Favourite (Cannell).—Flowers borne in large trusses; scarlet suffused with rosy magenta; free flowering; bushy sturdy habit; leaves slightly zoned.

194. Captain Fraser (Marshall).—Flowers of good form; clear scarlet; moderately free flowering; vigorous habit; leaves slightly zoned.

195.* Deuil de Mirabel (R.H.S.).—Flowers very large, borne in immense trusses; rich scarlet; free flowering; leaves plain green.

196.* Distinction (Cannell).—Flowers small bright scarlet; free flowering; dwarf compact habit; leaves round and deeply zoned.

197. Earl Manners (R.H.S.).—Flowers clear scarlet; free flowering; dwarf spreading habit; leaves slightly zoned.

198. General Dodds (Cannell).—Flowers clear scarlet; very free flowering; bushy habit; leaves slightly zoned.

199. General Wolseley (Pearson).—Flowers very large, of great substance borne in bold trusses; bright scarlet; bushy compact habit; leaves slightly zoned.

200. Hercule (Lemoine, Cannell).—Flowers bright scarlet; very free flowering; compact spreading habit; leaves slightly zoned.

201. Herrick (Pearson).—Flowers borne in large trusses; clear scarlet; bushy spreading habit; leaves distinctly zoned.

202. Hyacinth (Cannell).—Flowers of good form; bright scarlet; very free flowering; leaves slightly zoned.

203. John Ruskin (Cannell).—Flowers borne in great trusses, bright orange-scarlet; vigorous bushy habit; leaves distinctly zoned.

204. Joseph Casse (Brooks).—Flowers deep scarlet; free flowering; dwarf compact habit; leaves plain green.

205. Kitty (Pearson).—Flowers large, well formed, borne in very fine trusses, salmon scarlet blotched with blush-white on the upper petals; free flowering; leaves distinctly zoned.

206. Lord Aberdeen (Cannell).—Flowers bright scarlet; free flowering; vigorous spreading habit; leaves slightly zoned.

207. Lord Fraser (Cannell).—Flowers rich scarlet; rather shy flowering; vigorous habit; leaves faintly zoned.

208. M. D. Reydellet (Cannell).—Flowers bright scarlet; very free flowering; vigorous habit; leaves distinctly zoned.

209. Mrs. Gordon (Marshall).—Flowers scarlet tinged with rose; shy flowering; compact habit; leaves slightly zoned.

210. Red Eagle (Cannell).—Flowers large, borne in immense trusses, rich scarlet; spreading habit; leaves heavily zoned.

211. Rev. Bartram (Cannell).—Flowers large, of good form, borne in great trusses, scarlet touched with orange; compact bushy habit; leaves heavily zoned.

212. Royal Visit (Potten).—Flowers large, well-formed, bright scarlet; very free flowering; sturdy habit; leaves faintly zoned.

213. Soldiers' Tunic (Cannell).—Flowers bright scarlet;

moderately free flowering; spreading habit; leaves faintly zoned.

214. Sunbeam (Cannell).—Flowers orange-scarlet; free flowering; vigorous habit; leaves slightly zoned.

215. Sunray (Cannell).—Flowers borne in rather small trusses, scarlet shaded with orange; vigorous habit; leaves slightly zoned.

216. Suvarna (Cannell).—Flowers large, scarlet; free flowering; bushy compact habit; leaves plain green.

217.* Swanley Gem (Cannell).—Flowers scarlet shaded with rose; free flowering; bushy spreading habit; leaves broadly zoned.

218.* Tom Thumb (Cannell).—Flowers small, bright scarlet; free flowering; dwarf spreading habit; leaves plain green.

219. Triomphe de Stella, $\times \times \times$ August 19, 1897 (Cannell).—Flowers bright scarlet; very free flowering; bushy spreading habit; leaves deeply zoned.

220.* Vesuvius (Cannell).—Flowers bright scarlet; very free flowering; dwarf, compact bushy habit; leaves distinctly zoned. A useful bedder.

221. West Brighton Gem, **F.C.C.** May 25, 1880 (Cannell).—Flowers bright scarlet; exceptionally free flowering; dwarf bushy habit; leaves blotched with greenish yellow in the centre.

222. Zenobia, $\times \times \times$ October 22, 1897, as a winter bloomer (Pearson).—Flowers large, bright rosy scarlet; very free flowering; spreading habit; leaves slightly zoned.

XVII.—FLOWERS DOUBLE SCARLET AND ORANGE-SCARLET.

223. Althæa (Marshall, Cannell).—Flowers borne in great trusses, bright orange-scarlet; compact bushy habit; leaves distinctly zoned.

224. Australian Gold (Cannell).—Flowers orange-scarlet; free flowering; compact bushy habit; leaves slightly zoned.

225. Californie (Cannell).—Flowers semi-double, borne in large trusses, orange-scarlet; straggling habit; leaves heavily zoned.

226.* Captain H. Colville, $\times \times \times$ August 19, 1897 (R.H.S.).—Flowers rich scarlet; very free flowering; dwarf spreading habit; leaves plain green.

227. Double New Life (Cannell).—Flowers small, borne in

compact trusses, bright scarlet striped with pink, the centre petals being blush-white, which makes the flowers more curious than beautiful.

228. Erl King (Cannell).—Flowers orange-scarlet; free flowering; bushy habit; leaves deeply zoned.

229. Eteranthe (Cannell).—Flowers bright scarlet; very free flowering; vigorous habit; leaves deeply zoned.

230. General Davoust (Lemoine).—Flowers scarlet shaded with crimson; sturdy habit; leaves plain green.

231. Golden Gate (Cannell).—Flowers of a deeper shade than No. 224. The habit is bushy, and the leaves distinctly zoned.

232. Golden Rain (Cannell).—An improvement on 231.

233. Gustave Emich (Cannell).—Flowers borne in large trusses, bright scarlet; spreading habit; leaves slightly zoned.

234.* Ludwig Ferche (Cannell).—Flowers clear scarlet; free flowering; compact habit; leaves broadly zoned.

235. Madame Bruant (Cannell).—Flowers semi-double, bright orange-scarlet; shy flowering; vigorous habit; leaves deeply zoned.

236. M. Gelein Somaioie (Cannell).—Flowers bright orange-scarlet; free flowering; dwarf compact habit; leaves slightly zoned.

237. Mrs. Corden (Cannell).—Flowers scarlet, shaded with rose-pink; shy flowering; compact habit; leaves slightly zoned.

238. Napoleon (Lemoine).—Flowers orange-scarlet; shy flowering; vigorous habit; leaves slightly zoned.

239. Raspail (Cannell).—Flowers deep scarlet; free flowering; bushy compact habit; leaves deeply zoned.

240.* Raspail Improved, **A.M.** October 18, 1892 (Cannell).—The flowers are larger, more freely produced, and thrown higher above the foliage than those of No. 239. The best of its class.

241. Ville de Poitiers (Cannell).—Flowers semi-double, borne in handsome trusses, orange-scarlet shaded with rose; very free flowering; compact bushy habit; leaves deeply zoned.

XVIII.—FLOWERS SINGLE, CRIMSON AND CRIMSON-SCARLET.

242.* Ajax (Cannell, Lemoine).—Flowers large, borne in great trusses, crimson scarlet; bushy spreading habit; leaves plain green.

243. *Brilliantissima* (Cannell).—Flowers crimson scarlet; moderately free flowering; vigorous bushy habit; leaves slightly zoned.

244. *Duke of York* (Cannell).—Flowers large, borne in handsome trusses, crimson shaded with magenta; very free flowering; leaves plain green.

245. *Fiery Cross* (Cannell).—Flowers deep crimson; free flowering; tall vigorous habit; leaves plain green.

246.* *Henry Cannell*, Jun. (Cannell).—Flowers of good form and substance, borne in handsome trusses, crimson touched with purple; free flowering; vigorous spreading habit; leaves distinctly zoned.

247.* *Henry Jacoby*, $\times \times \times$ August 19, 1897 (Cannell).—Flowers borne in large trusses, deep crimson; free flowering; compact habit; leaves slightly zoned. A first-rate bedder.

248. *Jacquerie* (Lemoine).—Flowers of good form, intense crimson; moderately free flowering; diffuse habit; leaves plain green.

249.* *John Gibbons* (Cannell).—Flowers borne in large trusses, crimson scarlet; free flowering; bushy spreading habit; leaves plain green.

250. *Jules Lemaitre*, $\times \times \times$ October 4, 1897, as a winter bloomer (Lemoine).—Flowers large, borne in great trusses; very free flowering; vigorous habit; leaves slightly zoned.

251.* *King of the Bedders* (Cannell).—Flowers large, crimson-scarlet; free flowering; compact bushy habit; leaves slightly zoned.

252. *Lady Chesterfield* (Marshall).—Similar to No. 250.

253. *Lord Rosebery* (Cannell).—Flowers large; borne in handsome trusses; intense crimson; spreading habit; leaves distinctly zoned.

254. *Lord Salisbury* (Cannell).—Flowers large; borne in handsome trusses; magenta crimson; loose habit; leaves plain green.

255. *Metallic* (Cannell).—Flowers of good form; crimson touched with magenta; dwarf spreading habit; leaves plain green.

256. *Mr. Owen Thomas* (Cannell).—Flowers of good shape; rosy crimson; free flowering; compact bushy habit; leaves slightly zoned.

257.* Minos (Lemoine).—Flowers crimson ; moderately free flowering ; spreading habit ; leaves slightly zoned.

258. M. Myriel (Cannell).—Flowers borne in large trusses ; crimson scarlet ; diffuse habit ; leaves slightly zoned.

259. Paul Crampel (Lemoine).—Flowers very large, borne in great trusses well above the foliage ; crimson-scarlet ; exceptionally free flowering ; vigorous habit ; leaves slightly zoned.

260. Pluton (Lemoine).—Flowers large, borne in handsome trusses, crimson touched with purple ; free flowering ; vigorous habit ; leaves broadly zoned.

261. Souvenir de W. B. Miller (Cannell).—Flowers large, of good shape, crimson ; diffuse habit ; leaves plain green.

262. Trilby (Pearson).—Flowers borne in compact trusses, crimson shaded with cerise ; very free flowering ; leaves slightly zoned.

263. Volcanic (Cannell).—Flowers crimson-scarlet ; lower petals suffused with purple towards the edges ; shy flowering ; spreading habit ; leaves plain green.

264. W. H. Smith (Cannell).—Flowers shaded magenta ; free flowering ; diffuse habit ; leaves plain green.

XIX.—FLOWERS DOUBLE CRIMSON AND CRIMSON-SCARLET.

265. Charles Lalande (Cannell).—Flowers deep crimson ; shy flowering ; dwarf compact habit ; leaves plain green.

266. Colossus, **F.C.C.** June 11, 1862 (Cannell).—Flowers very large, borne in dense trusses, crimson-scarlet ; free flowering ; spreading habit ; leaves slightly zoned.

267. Corsaire (Lemoine).—Flowers borne in rather small trusses, rosy crimson ; shy flowering ; compact sturdy habit ; leaves plain green.

268. Crimson Velvet (Cannell).—Flowers deep crimson ; free flowering ; bushy compact habit ; leaves slightly zoned.

269. Double Jacoby (Cannell).—A remarkably fine double flowered form of No. 247.

270. Grand Chou Faideherbe (Cannell).—Flowers borne in large trusses, rosy crimson ; spreading habit ; leaves slightly zoned.

271.* Rafaël Garreta (Cannell).—Flowers intense crimson, suffused with purple ; very free flowering ; compact sturdy habit ; leaves slightly zoned.

272. Schallcher (Lemoine).—Flowers borne in immense trusses, deep crimson; moderately free flowering; vigorous habit; leaves large and broadly zoned.

273. Sombre Horizon (Cannell).—Flowers very deep crimson; free flowering; spreading habit; leaves slightly zoned.

274. Turtle's Surprise, **A.M.** July 8, 1890 (Cannell).—Flowers bright crimson borne on cream-white stalks tinged with pink; free flowering; compact bushy habit; leaves distinctly zoned and splashed with greenish yellow in the centre.

XX.—FLOWERS WITH LIGHT-COLOURED CENTRES SHADED
AND MARGINED WITH VARIOUS COLOURS.

275. Adolphe Brisson, $\times \times \times$ October 4, 1897, as a winter bloomer (Lemoine).—Flowers borne in enormous trusses, rich carmine, shaded with pink towards the white centre; free flowering; compact habit; leaves plain green or very faintly zoned.

276. Commandant Barré (Cannell).—Similar, but inferior, to No. 284.

277. Fleur Poitevine (Cannell).—Flowers borne in very large trusses, rosy carmine, blush-coloured centre; free flowering; spreading habit; leaves plain green.

278. Lady Newton (Marshall, Cannell).—Flowers shaded salmon and bordered with salmon-red; free flowering; spreading habit; leaves slightly zoned.

279.* Lecomte de Lisle, $\times \times \times$ October 4, 1897, as a winter bloomer (Lemoine).—Flowers orange-scarlet, with a blush-pink centre; very free flowering; compact habit; leaves indistinctly zoned.

280. Le Rhône, $\times \times \times$ October 22, 1897, as a winter bloomer (Cannell).—Flowers of good form, rosy carmine, with a pale pink centre; free flowering, dwarf habit; leaves plain green.

281. Madame Bruant (Cannell).—Flowers marbled with pink on a white ground, and margined with rose-pink; vigorous habit; leaves plain green.

282. Madame de Boudeville (Cannell).—Flowers borne in large trusses, shaded pink, with a distinct picotee edge; compact bushy habit; leaves slightly zoned.

283. Madame Hoste (Cannell).—Flowers shaded pink and

bordered with orange-scarlet; very free flowering; spreading habit; leaves slightly zoned.

284. *Madame Jules Chrétien* (Cannell).—Flowers rich scarlet shaded with pink towards the centre; free flowering; compact bushy habit; leaves slightly zoned.

285. *Negus Menelik* (Lemoine).—Flowers deep rose-pink touched with scarlet; centre white; free flowering; bushy habit; leaves very slightly zoned.

286. *Omphale* (Cannell, Lemoine).—Flowers borne in large trusses, salmon shaded with pale pink and bordered with rose-pink; free flowering; dwarf compact habit; leaves slightly zoned.

287. *Thésée* (Lemoine).—Flowers bright scarlet, with a blush white centre; exceptionally free flowering; diffuse habit; leaves slightly zoned.

XXI.—VARIETIES WITH SPOTTED FLOWERS.

288. *Belle Alliance* (Lemoine).—Flowers white, spotted and splashed with rose-pink; free flowering; spreading habit; leaves plain green.

289. *Jeanne d'Arc* (Cannell).—Flowers double, pale pink with deep pink spots; bushy spreading habit; leaves plain green.

290. *Madame Beauvron* (Cannell).—Flowers borne in large trusses, pink, spotted with red; dwarf habit; leaves plain green.

291. *Oreste* (Lemoine).—Flowers borne in very large trusses, pink, spotted with rose; free flowering; spreading habit; leaves slightly zoned.

292. *Surprise* (Cannell).—Flowers double, pale pink, with deeper spots; shy flowering; vigorous habit; leaves slightly zoned.

REPORT ON VIOLAS AT CHISWICK, 1898.

A collection of 174 varieties of *Violas* were grown on a west and north border: six plants of each were planted out on March 24, and although the terribly hot and dry season was against *Violas*, the plants made satisfactory growth and yielded a large quantity of flowers; but they were on the whole smaller and faded earlier than usual.

F.C.C. = First-class Certificate.

A.M. = Award of Merit.

× × × = Highly Commended.

I.—FLOWERS YELLOW.

1. Aberdonian Yellow (Cocker).—Dwarf habit; free flowering; flowers of medium size with dark rays. In flower May 9.

2. A. J. Rowberry, **A.M.** June 25 1896 (Dobbie).—Loose straggling habit; very free flowering; flowers large and of good form. In flower May 9.

3. Ardwell Gem, × × × July 4, 1893 (Dobbie).—Dwarf spreading habit; flowers pale yellow, with dark rays. In flower April 30.

4. Border Maid (Forbes).—Compact habit; flowers soft yellow, with dark rays and blotches, and irregularly margined with lavender blue. In flower May 10.

5. Bullion, × × × July 5, 1898 (Dobbie and Forbes).—Bushy spreading habit; flowers deep yellow, with dark rays. A free and continuous bloomer. In flower May 7.

6. Cephalonia (Crane).—Bushy habit; free flowering; flowers large and of good form. In flower May 7.

7. Duchess of Fife, × × × August 29, 1893 (Dobbie).—Compact habit; very free flowering; flowers light primrose edged with blue, the upper petal white. In flower May 7.

8. Endymion (Crane).—Dwarf compact habit; free flowering; flowers pale yellow, lower petal stained with a deeper shade and slightly rayed. In flower May 9.

9. Eynsford Gem (Forbes).—Dwarf habit; free flowering; flowers very deep yellow, with slight rays. In flower May 9.

10. George Lord (Forbes and Dobbie).—Compact habit,

moderately free flowering; flowers of medium size, clear primrose yellow. In flower May 7.

11. George Muirhead, $\times \times \times$ July 4, 1893 (Forbes & Dobbie).—Dwarf bushy habit; free flowering; flowers large, rich primrose yellow. A continuous bloomer. In flower May 7.

12. Goldfinch (Forbes & Dobbie).—Very dwarf habit; free flowering; flowers golden yellow, irregularly bordered with lilac. A continuous bloomer. In flower May 11.

13. Jackanapes, $\times \times \times$ July 5, 1898 (Forbes).—Bushy habit; very free flowering; flowers small, golden yellow with dark rays; upper petals brownish crimson edged with yellow. A continuous bloomer. In flower May 13.

14. Lizzie Lindsay (Forbes).—Dwarf spreading habit; shy flowering; flowers canary yellow, lower petal very deep yellow. In flower May 12.

15. Lord Elcho, $\times \times \times$ July 4, 1893 (Forbes & Dobbie).—Vigorous grower; free flowering; flowers deep golden yellow with dark rays. In flower May 14.

16. Luteola (Dobbie).—Dwarf spreading habit; shy flowering; flowers very pale yellow; lower petal canary yellow. In flower May 9.

17. Mary Gilbert (Forbes & Dobbie).—Similar to No. 15.

18. Miss Primrose (Forbes).—Loose habit; flowers sulphur yellow, deeper towards the centre. In flower May 10.

19. Mrs. Daniels (Forbes).—Straggling habit; free flowering; flowers clear yellow. In flower May 11.

20. Myra (Dobbie).—Compact habit; free flowering; flowers small, canary yellow; upper petal primrose yellow. In flower May 9.

21. Oriole (Forbes).—Dwarf habit; free flowering; flowers sulphur yellow. In flower May 9.

22. Princess Louise, $\times \times \times$ July 5, 1898 (Dobbie).—Dwarf spreading habit; very free flowering; flowers rich yellow, of medium size and great substance. In flower May 9.

23. Princess of Wales, **A.M.** October 15, 1895 (Dobbie).—Very dwarf spreading habit; exceptionally free flowering flowers small, deep yellow with slight rays. In flower May 9.

24. Sir Robert Peel (Crane).—Spreading habit; free flowering; flowers primrose yellow and slightly rayed. In flower May 9.

25. *Sulphurea* (Forbes).—Bushy habit; shy flowering; flowers sulphur yellow with distinct rays. In flower May 10.

26. *Unique* (Crane).—Similar to No. 6.

27. *Wonder* (Dobbie).—Dwarf habit; free flowering; flowers very deep yellow with dark rays. In flower May 9.

II.—FLOWERS WHITE.

28. *Accushla* (Dobbie).—Dwarf habit; free flowering; flowers white with purple rays and bordered with bluish purple. In flower May 11.

29. *Blue Cloud* (Dobbie).—Spreading habit; very free flowering; flowers white edged with blue. In flower May 10.

30. *Border Witch* (Dobbie).—Dwarf habit; flowers white streaked and suffused with pale blue. In flower May 9.

31. *Bridal Wreath* (Forbes).—Dwarf compact habit; very free flowering; flowers of medium size, pure white. In flower May 9.

32. *Buccleuch Gem* (Forbes).—Tall habit; flowers large, white with violet rays. In flower May 10. A free and continuous bloomer.

33. *Butterfly* (Dobbie).—Straggling habit; free flowering; flowers edged with rose. In flower May 9.

34. *Cecilia* (Dobbie).—Bushy habit; flowers white bordered and striped with rose-pink, upper petals blotched with rose-pink. In flower May 9.

35. *Christiana*, $\times \times \times$ July 4, 1893 (Dobbie).—Spreading habit; very free flowering; flowers large, with a clear yellow eye. In flower May 9.

36. *Claudia* (R.H.S.).—Compact bushy habit; flowers shaded with pale blue. In flower May 13.

37. *Cordelia* (Dobbie).—Similar to No. 35.

38. *Colleen Bawn* (Forbes & Dobbie).—Vigorous grower; shy flowering; flowers large with purple rays. In flower April 23.

39. *Countess of Hopetoun*, $\times \times \times$ July 5, 1898 (Forbes & Dobbie).—Compact habit; very free flowering; flowers large with purple rays. In flower May 7. A continuous bloomer.

40. *Egeria* (R.H.S.).—Dwarf habit; very free flowering; flowers cream-white striped and mottled with pale blue. In flower May 12.

41. Flower of Day (Dobbie).—Loose habit; flowers small, cream-white. In flower May 7.

42. H. Lander (Forbes).—Bushy habit; free flowering; flowers small, shaded with pale lavender. In flower May 9. A continuous bloomer.

43. Illumination (R.H.S.).—Bushy habit; flowers cream-white. In flower May 16.

44. James Cocker (Dobbie).—Dwarf spreading habit; shy flowering; flowers large white, with purple rays. In flower May 9.

45. Jeannie P. Robertson (Forbes).—Compact habit; very free flowering; flowers cream-white, of medium size and great substance. In flower May 9. A continuous bloomer.

46. Lady Dundonald (Dobbie).—Dwarf spreading habit; very free flowering; flowers pure white with purple rays. In flower May 11. A continuous bloomer.

47. Lady Salisbury (Forbes).—Robust grower; moderately free flowering; flowers large, white with purplish violet veins. In flower May 9.

48. Laverock (Dobbie).—Dwarf habit; shy flowering; flowers large and of good form, white with purple rays and faintly edged with blue. In flower May 14.

49. Lucellia Gold (Dobbie).—Straggling habit; shy flowering; flowers white with blue rays and edged with sky blue. In flower May 12.

50. Lychordia (Dobbie).—Compact habit; flowers large, white with purple rays, and irregularly bordered with purple and mauve. In flower May 11.

51. Marchioness, **A.M.** July 27, 1898 (Forbes & Dobbie).—Spreading habit; very free flowering; flowers large and of good form, cream-white. In flower May 10. A continuous bloomer.

52. Marchioness of Tweedale (Dobbie).—Dwarf compact habit; very free flowering; flowers shaded with pale blue. In flower May 7. A continuous bloomer.

53. Mrs. Kinnaird (Dobbie).—Tall habit; shy flowering; flowers round with purplish rays. In flower May 11.

54. Mrs. Palmer (Forbes & Dobbie).—Dwarf compact habit; moderately free flowering; flowers cream-white, with dark rays and irregularly bordered with pale blue. In flower May 9.

55. Mrs. Scott (Dobbie).—Spreading habit; moderately free flowering; flowers of good form. In flower May 9.

56. Mary Scott (Forbes).—Compact habit; flowers shaded with blue. In flower May 10.

57. Mayflower (Forbes).—Compact habit; free flowering; flowers large, with purple rays and faintly margined with blue. In flower May 9. A continuous bloomer.

58. Nellie (Crane).—Spreading habit; very free flowering; flowers pure white and of great substance. In flower May 9.

59. Pencaitland, $\times \times \times$ July 5, 1895 (Dobbie).—Compact bushy habit; very free flowering; flowers of excellent shape and substance. In flower May 9.

60. Robert Turnbull (Forbes).—Compact habit; free flowering; flowers cream-white with blue rays, upper petal shaded with blue. In flower May 9.

61. Sylvia, $\times \times \times$ July 4, 1893 (Forbes & Dobbie).—Bushy spreading habit; exceptionally free flowering; flowers cream white, large, of good shape and great substance. In flower May 7.

62. Vestal, F.C.C. July 25, 1877 (Dobbie).—Straggling habit; flowers of medium size and good form. In flower May 10.

63. White Duchess (Dobbie).—Compact habit; free flowering; flowers large, cream-white, with irregular pale blue margins. In flower May 11.

64. White Flag (Forbes & Dobbie).—Straggling habit; flowers large, round, with purple rays and of great substance. In flower May 9.

65. White Heart (Dobbie).—Spreading habit; very free flowering; flowers large with light blue rays. In flower May 11. A continuous bloomer.

66. William Daniels (Forbes).—Bushy habit; very free flowering; flowers large and of good form. In flower May 9. A continuous bloomer.

III.—FLOWERS MAUVE AND LILAC.

67. Annie King (Dobbie).—Compact habit; moderately free flowering; flowers lilac shaded with rose, deeper towards the centre. In flower May 9.

68. Ariel (Forbes).—Bushy spreading habit; free flowering;

flowers delicate mauve with dark rays and shaded with cream-white. In flower May 9. A continuous bloomer.

69. Bedding Rose (Forbes).—A large-flowered form of No. 81.

70. Blush Queen (Dobbie).—Spreading habit; flowers pale mauve and of good form. In flower May 7.

71. Bridegroom, $\times \times \times$ July 27, 1898 (Forbes).—Dwarf compact habit; exceptionally free flowering; flowers soft pale lavender. In flower May 13. A continuous bloomer.

72. Charm (Dobbie).—Straggling habit; free flowering; flowers warm lilac suffused with rose. In flower May 10.

73. Cherry Park (Forbes & Dobbie).—Dwarf compact habit; free flowering; flowers pale lilac with purple shadings and rose-purple rays. In flower May 10.

74. Diana, $\times \times \times$ July 5, 1898 (Forbes).—Compact habit; free flowering; flowers pale lilac on a white ground with dark rays. In flower May 9. A continuous bloomer.

75. Duchess of Sutherland, $\times \times \times$ July 22, 1890 (Forbes).—Straggling habit; free flowering; flowers rosy-mauve touched with white. In flower May 10.

76. Evelyn (Dobbie).—Poor straggling habit; flowers dark lilac running to a lighter shade towards the edges. In flower May 9.

77. Florizel (Dobbie).—Loose habit; free flowering; flowers pale lilac of good shape. In flower May 9.

78. Gipsy Queen, $\times \times \times$ July 27, 1898 (Dobbie).—Spreading habit; free flowering; flowers large, mauve-streaked and shaded with lilac and violet. In flower May 15.

79. Lavender King (Dobbie).—Straggling habit; flowers very large pale lavender, shaded with mauve.

80. Lilacina (Dobbie).—Compact spreading habit; very free flowering; flowers dark lilac with deeper blotches. In flower May 11.

81. Lilian (Dobbie).—Dwarf compact habit; free flowering; flowers clear lilac. In flower May 9. A continuous bloomer.

82. Lottie McNeil (Forbes).—Compact habit; free flowering; flowers large pale lavender. In flower May 9.

83. Minnie (Dobbie).—Poor habit; flowers reddish mauve and white, upper petal bluish white. In flower May 7.

84. Mrs. Forbes (Forbes).—Straggling habit; flowers lilac

and white, suffused and margined with violet. In flower May 18.

85. *Norah May* (Dobbie).—Straggling habit; flowers large mauve with pale blue rays. In flower May 9.

86. *Quaker Maid* (Dobbie).—Spreading habit; flowers large rosy-lavender with slight rays. In flower May 10.

87. *Rosea pallida* (Forbes & Dobbie).—Compact habit; very free flowering; flowers pale lilac with deeper rays. In flower May 14.

88. *Sweet Lavender* (Dobbie).—Straggling habit; flowers delicate lilac. In flower May 9.

IV.—FLOWERS LIGHT AND DARK BLUE.

89. *Aimée* (Forbes).—Dwarf spreading habit; shy flowering; flowers large pale blue, upper petals reddish purple. In flower May 10.

90. *Archibald Grant* (Forbes & Dobbie).—Compact habit; free flowering; flowers deep blue, large, and handsome. In flower May 7.

91. *Astern* (Forbes).—Compact habit; free flowering; flowers dark blue with deeper blotches. In flower May 9.

92. *Beauty of Chipping Norton* (Forbes).—Straggling habit; flowers dark blue with deep purple rays.

93. *Blue Bell*, F.C.C. August 29, 1874 (Forbes).—Dwarf compact habit; very free flowering; flowers small, blue with dark rays. In flower May 9.

94. *Blue Gown* $\times \times \times$ July 5, 1898 (Dobbie).—Dwarf compact habit; very free flowering; flowers rich blue. In flower May 7.

95. *Blue King*, F.C.C. June 27, 1876 (Forbes).—Compact habit; free flowering; flowers of good shape, blue with dark blotches. In flower May 9.

96. *Columbia* (Dobbie).—Dwarf habit; flowers very deep blue running to lavender blue towards the margins. In flower May 9.

97. *Commodore* (Dobbie).—Spreading habit; free flowering; flowers bluish lilac, white centre. In flower May 11.

98. *Cottage Maid* (Crane).—Compact bushy habit; flowers blue, shaded with purple. In flower May 11.

99. *Countess of Kintore* (Forbes & Dobbie).—Loose habit;

free flowering; flowers dark blue, shaded with purple and broadly margined with pale blue. Very showy. In flower May 9.

100. Dr. Livingstone (Forbes).—Straggling habit; shy flowering; flowers rich blue shaded with violet.

101. Duchess of Albany (Forbes).—Straggling habit; flowers blue shaded with rose; yellow eye. In flower May 9.

102. Holyrood, F.C.C. July 25, 1877 (Dobbie).—Compact habit; free flowering; flowers blue, with deep blue blotches. In flower May 12.

103. Iona, A.M. July 24, 1894 (Dobbie).—Spreading habit; free flowering; flowers deep purplish blue blotched with blue, upper petal lavender blue. Very showy. In flower May 12.

104. Iris (Dobbie).—Vigorous grower; flowers blue, shaded with purple on lower petals. Very distinct. In flower May 12.

105. J. Tullett (Forbes).—Dwarf compact habit; flowers light blue flaked with purple; bright yellow centre. In flower May 12.

106. J. W. Moorman (Forbes).—Bushy habit; flowers large, dark blue shading to light blue. In flower May 9.

107. Max Kolb (Forbes & Dobbie).—Loose habit; free flowering; flowers bright purplish blue with dark blotches. In flower May 12.

108. Mrs. C. F. Gordon, $\times \times \times$ July 5, 1898 (Dobbie).—Spreading habit; free flowering; flowers dark blue, upper petals light blue. In flower May 9.

109. Mrs. Wood (Forbes).—Straggling habit; flowers blue shaded with purple, upper petal striped with a darker shade. In flower May 9.

110. Miss A. W. Young (Crane).—Robust grower; free flowering; flowers blue shaded with purple, upper petal pale blue. In flower May 13.

111. Sir Robert Puller, $\times \times \times$ July 5, 1898 (Forbes).—Compact habit; free flowering; flowers large and handsome; blue with darker rays. In flower May 9. A continuous bloomer.

112. Souvenir (Forbes).—Vigorous grower; flowers large, lavender blue with darker centre; clear yellow eye. In flower May 9.

113. Startler (Forbes).—Dwarf habit; flowers large pale blue blotched with purplish blue, yellow eye. In flower May 9.

114. Sweet Lavender (Forbes).—Dwarf habit; free flowering; flowers large deep lavender. In flower May 12.

115. William Allardice (Forbes).—Poor straggling habit; flowers violet-blue shaded with purple. In flower May 9.

116. William Haig (Forbes & Dobbie).—Spreading habit; flowers dark blue with purple shadings. In flower May 10.

V.—FLOWERS ROSE.

117. Ada Adair (Dobbie).—Dwarf habit; shy flowering; flowers rosy purple. In flower May 9.

118. Cecilia (Forbes).—Compact habit; free flowering; flowers rose-pink, white centre with deep blue rays; very showy. In flower May 11.

119. Crepon (Crane).—Bushy habit; free flowering; flowers large, rose shaded with purple. A continuous bloomer. In flower May 9.

120. Exquisite (Forbes).—Compact habit; flowers bright rose; lower petals white, blotched and shaded with rose. In flower May 9.

121. Hamlet (Forbes).—Straggling habit; free flowering; flowers large, rose shaded with lilac. Distinct. In flower May 9.

122. Ida's Choice (Dobbie).—Straggling habit; flowers rosy-purple marked with white. In flower May 12.

123. J. B. Riding, $\times \times \times$ July 5, 1898 (Forbes & Dobbie).—Sport from William Neil. Spreading habit; very free flowering; flowers purplish rose, pale mauve centre with deep rays. In flower May 9.

124. Lillie Langtry (Dobbie).—Spreading habit; flowers rosy-purple striped with pale pink.

125. Mary Stuart Hamilton (Forbes & Dobbie).—Bushy habit; flowers rose and purple, blush-white centre, with blue rays and edged with pink.

126. Miss Gibson (Dobbie).—Spreading habit; flowers rose shaded with lilac. In flower May 9.

127. Princess Beatrice (Forbes).—Straggling habit; flowers rose, dark blue towards the yellow eye. In flower May 11.

128. Rosemary (Forbes).—Dwarf compact habit; free flowering; flowers large, rich rose shaded with lilac. In flower May 9.

129. Sweetness (Forbes).—Straggling habit; flowers pale

rose, white towards the centre. Very attractive. In flower May 11.

130. William Neil, **A.M.** July 5, 1897 (Forbes).—Compact habit; free flowering; flowers large, pale rosy-lilac, lighter towards centre. Stands drought well. In flower May 9.

VI.—FLOWERS PURPLE.

131. Acme (Dobbie).—Bushy habit; free flowering; flowers large with round petals, rich purple touched with crimson. In flower May 9.

132. Aurora (Forbes).—Loose habit; free flowering; flowers large, purple shaded with blue. In flower May 10.

133. Craigie (Dobbie).—Straggling habit; flowers of great substance, rich purple, upper petals shaded with blue. In flower May 9.

134. Crimson Beauty (Forbes).—Straggling habit; free flowering; flowers purplish-crimson, upper petal lighter shade touched with violet. In flower May 16.

135. Crimson King (Dobbie).—Dwarf habit; flowers purplish-crimson, lower petal shaded with violet. In flower May 13.

136. Crown Jewel, **F.C.C.** June 27, 1876 (Dobbie).—Compact habit; free flowering; flowers deep purple blotched with light purple. In flower May 9.

137. Cynthia (Forbes).—Bushy habit; free flowering; flowers rich purple, shaded with rose, upper petal light purple. In flower May 13.

138. Dandie Dinmont (Dobbie).—Straggling habit; flowers rosy-purple shading to pale blue. In flower May 11.

139. Fascination (Forbes).—Compact habit; free flowering; flowers of good shape, light purple suffused with magenta and heavily rayed. In flower May 9.

140. Hamish, × × × July 5, 1898 (Dobbie).—Spreading habit; very free flowering; flowers large, rosy purple with deep purple rays. A continuous bloomer. In flower May 9.

141. H. M. Stanley (Dobbie).—Straggling habit; flowers deep purple with lighter rays. In flower May 7.

142. Hibernia (Dobbie).—Straggling habit; shy flowering; flowers dark violet and purple, upper petal pale blue. In flower May 9.

143. H. W. Stewart (Forbes).—Compact habit; free

flowering; flowers blackish purple mottled with rose, bright yellow eye. In flower May 9.

144. James Robertson (Forbes).—Dwarf compact habit; free flowering; flowers very large, deep purple shaded with violet, upper petal rosy purple. In flower May 9.

145. Lady Amory (Dobbie).—Dwarf habit; flowers of good shape and substance, deep purple, upper petals bordered with lavender blue. In flower May 9.

146. Lady Hay (Forbes).—Straggling habit; flowers rosy purple, with dark rays and rich yellow centre. In flower May 16.

147. Lord Malcolm (Dobbie).—Loose habit; free flowering; flowers deep purple. In flower May 9.

148. Lucy Bertram (Dobbie).—Straggling habit; flowers rosy purple, running to pale blue. Very showy. In flower May 9.

149. Maggie (Forbes).—Compact habit; flowers purplish magenta. In flower May 10.

150. Mary McDonald (Forbes).—Straggling habit; flowers deep purple, shaded with blue towards the centre. In flower May 11.

151. Mrs. Grant (Dobbie).—Compact habit; flowers rosy purple, deeper shade towards centre, upper petal very pale blue. In flower May 7.

152. Mrs. H. Bellamy, A.M. July 5, 1897 (Dobbie).—Spreading habit; free flowering; flowers deep purple shaded with violet, upper petal lavender blue. In flower May 9.

153. Mrs. R. K. Mitchell (Forbes).—Dwarf habit; free flowering; flowers large, purplish rose, white centre with slight rays. In flower May 9.

154. Mozambique (Dobbie).—Loose habit; flowers pale purple, blotched with pale blue, upper petals lavender blue. In flower May 16.

155. Neptune (Forbes & Dobbie).—Bushy habit; free flowering; flowers bright purple, upper petals light blue. In flower May 8.

156. Osiris (Crane).—Dwarf habit; flowers dark purple, suffused with rose, upper petal touched with mauve. In flower May 9.

157. Ravenswood (Dobbie).—Straggling habit; shy flowering;

flowers dark purple streaked with pale blue towards the centre. In flower May 9.

158. Romeo (Dobbie).—Straggling habit; flowers light purple heavily blotched with deep purple and suffused with magenta. In flower May 9.

159. Sunrise (Dobbie).—Straggling habit; flowers large, rosy purple shaded with violet towards the centre. In flower May 10.

160. Sunrise Sport (Dobbie).—Compact habit; flowers rosy purple, striped with pale blue, lower petal shaded with blue. In flower May 13.

161. The Mearns, $\times \times \times$ July 4, 1893 (Forbes & Dobbie).—Bushy habit; free flowering; flowers rich plum-purple, upper petals pale blue. In flower May 12.

VII.—FLOWERS BRONZE.

162. Bronze Queen, $\times \times \times$ June 16, 1898 (Forbes).—Compact habit; very free flowering; flowers large and of excellent shape, dark bronze-brown shaded with rosy purple. In flower May 13.

163. Garnkirk (Dobbie).—Bushy habit; flowers bronze-brown, with dark blotches, and margined with purple.

VIII.—MINIATURE FLOWERED VIOLAS.

164. Blanche (Dobbie).—Compact habit; very free flowering; flowers white with prominent yellow eye. In flower May 11.

165. Gnome (Forbes).—Very dwarf habit; free flowering; flowers cream colour, lower petals deep yellow. In flower May 10.

166. Gold Crest (Dobbie).—Compact habit; very free flowering; flowers deep yellow. A continuous bloomer. In flower May 11.

167. Lyric (Forbes).—Bushy habit; free flowering; flowers pale lilac. A continuous bloomer. In flower May 13.

168. Marginata (Forbes).—Dwarf habit; very free flowering; flowers paper white, bordered with blue. In flower May 9.

169. Mrs. George Finlay (Forbes).—Compact habit; shy flowering; flowers rich yellow, upper petals cream-white. In flower May 9.

170. Oliver (Dobbie).—Loose habit; rather shy flowering; flowers clear blue. In flower May 9.

171. Ophir (Forbes).—Straggling habit; free flowering; flowers deep golden yellow. In flower May 9.

172. Picotee (Dobbie).—Compact habit; free flowering; flowers white, slightly edged with blue, and in some cases they are streaked and splashed with pale blue. In flower May 9.

173. Violetta (Forbes & Dobbie).—Dwarf habit; free flowering; flowers white and very fragrant. A continuous bloomer. In flower May 9.

174. Wrajment, $\times \times \times$ July 5, 1898 (Forbes).—Dwarf habit; very free flowering; flowers cream-white, upper petals touched with pale blue. In flower May 11.

REPORT ON ANNUALS AT CHISWICK, 1898.

A collection of 138 stocks of Annuals was sown in rows on a south and west border, on April 18, in deeply dug and fairly rich soil. The seed germinated well, and the plants grew freely and promised well until the long drought set in in June, when growth practically ceased and greatly interfered with the floral display, which was of unusually short duration. The Floral Committee inspected the collection on three occasions.

F.C.C.=First-class Certificate.

A.M.=Award of Merit.

$\times \times \times$ =Highly Commended.

AGERATUM.

1. Imperial Dwarf Blue (Watkins & Simpson).—Plants of various heights and flowers of different shades of blue. Requires further selection.

ALYSSUM.

2. Maritimum minimum, $\times \times \times$ July 27, 1898 (R. Veitch).—Height 4 inches; plants of spreading habit, well adapted for carpeting beds; flowers white, freely produced.

CALLIOPSIS.

3. Crimson King (Watkins & Simpson).—Height 10 inches; free flowering; flowers brownish crimson.

CANDYTUFT.

4. Hyacinth-flowered, white (Watkins & Simpson).—Height 1 foot; flowers very large, pure white, but needs a little more selection.

5. Rose Cardinal, $\times \times \times$ July 27, 1898 (Watkins & Simpson). Height 1 foot; plants of bushy spreading habit; flowers deep rose.

CELOSIA.

6. *Pyramidalis coccinea* (Forbes).—Vigorous in growth and produces long and graceful bright scarlet plumes.

CENTAUREA.

7. *Cyanus minor*, white (Watkins & Simpson, Veitch).—Height 18 inches; very free flowering; flowers white shaded with lavender.

8. *Cyanus minor*, blue (Veitch).—Height 20 inches; free flowering; flowers deep blue, changing to purple towards the eye.

9. *Cyanus minor*, rose (Veitch).—Height 15 inches; free flowering; flowers soft rose.

10. *Cyanus minor*, Victoria (Veitch).—Height 8 inches, compact habit; very free flowering; flowers small, deep blue.

11. *Cyanus minor*, double mixed (Veitch).—Height 18 inches; flowers double and semi-double, freely produced; colours varying from deep blue to pale rose.

12. *Cyanus depressa* (Veitch).—Height 10 inches; spreading habit; free flowering; flowers intense blue, with a deep purple eye.

13. Marguerita (Veitch) { For description see Vol. XXI.,
14. „ blue („) { page 302.

CHRYSANTHEMUM.

15. *Atrococcineum* (Veitch).—Height 18 inches; moderately free flowering; flowers brownish crimson, with a yellow band round the purple disc.

16. *Burridgeanum* (Veitch, Watkins & Simpson).—Height 18 inches; very free flowering; flowers purple and yellow.

17. *Carinatum tricolor* (Veitch).—Similar to No. 16.

18. *Coronarium*, double lemon (Veitch).

19. „ „ white („).

20. „ „ yellow („).

(See Vol. XXI., page 302.)

21. *Dunnettii*, fl. pl. (Veitch).—Height 18 inches; very free flowering; flowers white, with a band of lemon yellow near the deep purple disc.

22. *Dunnettii*, double golden (Veitch).—Height 18 inches; flowers large and double; colour rich yellow. Requires a little more selection.

23. *Inodorum plenissimum* (Veitch).—Height 14 inches; flowers double white, produced on plants with dark feathery foliage.

24. *Lord Beaconsfield* (Veitch).—Similar to No. 16.

25. *Luteum* (Veitch).—Height 16 inches; very free flowering; flowers deep golden yellow with a bright purple disc.

26. *Segetum* (Veitch).—Height 18 inches; very free flowering; flowers deep golden yellow.

27. *The Sultan* (Veitch).—An improved form of No. 15.

28. *Tricolor*, double (Veitch).—Height 18 inches. A very fine selection, with large flowers of rich and varied colours.

29. *Venustum* (Veitch).—Height 18 inches; very free flowering; flowers white and purple, with a lemon-yellow band round the purple disc.

30. *W. E. Gladstone* (Veitch).—Similar to No. 15.

CLARKIAS.

31. *Elegans* (Veitch).

32. *Elegans rosea*, fl. pl., x x x July 27, 1898 (Veitch).

33. *Pulchella* (Veitch).

34. *Pulchella alba* (Veitch).

35. *Pulchella alba*, fl. pl. (Veitch).

36. *Pulchella*, fl. pl. (Veitch).

37. *Pulchella marginata*, fl. pl. (Veitch).

38. *Integripetala* (Veitch).

39. *Integripetala alba* (Veitch).

40. *Integripetala* 'Mrs. Langtry' (Watkins & Simpson).

(For description see Vol. XXI., page 302.)

CONVOLVULUS.

41. *Minor* (Watkins & Simpson).—Height 1 foot; very free

flowering; flowers dark blue, shading to white towards the pale yellow eye.

COSMOS.

42. New Early Giant (R. Veitch).—The plants grew well, but did not flower.

DATURA.

43. *Ceratocaulis* (Mottet).—Height 2 feet; plants of free branching habit, with stout glaucous stems and pale green leaves; shy flowering; flowers very large, funnel-shaped, white suffused with pale lavender towards the margins of the corolla.

DIANTHUS CHINENSIS.

44. *Heddewegii* (Veitch).

45. *Heddewegii* *diadematis*, fl. pl. (Veitch).

46. *Heddewegii*, double white (Veitch).—Height 10 inches; bushy habit; flowers large, pure white. A good strain.

47. *Heddewegii*, double crimson (Veitch).—Height 8 inches; late flowering; flowers large, deep crimson.

48. *Heddewegii*, double mixed (Veitch).—Height 8 inches; flowers large, very double, and comprise shades of rose, crimson, pink, white, &c. A good selection.

49. *Heddewegii* *laciniatus*, $\times \times \times$ August 16, 1898 (Veitch).

50. *Heddewegii* *laciniatus*, fl. pl. (Veitch).

51. *Heddewegii*, fl. pl., $\times \times \times$ August 16, 1898 (Veitch).—Height 8 inches; sturdy habit; very free flowering; flowers large, very double, crimson margined with rose pink.

52. *Heddewegii*, purity double white (Watkins & Simpson). Similar to No. 46.

53. *Heddewegii* *Salmon Queen* (Veitch).

54. *Heddewegii* *The Bride* (Veitch). (For description see Vol. XXI., page 303.)

ESCHSCHOLTZIA.

55. *Mandarin*, $\times \times \times$ July 18, 1898 (Watkins & Simpson). See Vol. XXI., Part II., page 303.)

56. *Carminia rosea* (Watkins & Simpson).—Height 1 foot; very free flowering; flowers carmine and rose.

GYPSOPHILA.

57. *Elegans*, pure white, $\times \times \times$ July 27, 1898 (Watkins & Simpson).—Height 15 inches; graceful habit; flowers pure white.

GODETIAS.

58. Bridesmaid (Veitch).
59. Butterfly, $\times \times \times$ July 27, 1898 (Veitch).
60. Duchess of Albany (Veitch).
61. Duchess of Albany compacta, $\times \times \times$ July 27, 1898 (Watkins & Simpson).
62. Fairy Queen, $\times \times \times$ July 27, 1898 (Watkins & Simpson). Height 8 inches; flowers white with small scarlet blotches. A showy variety.
63. Gloriosa, **A.M.** July 27, 1897 (Veitch).—Height 1 foot; compact habit; free flowering; flowers intense crimson, shading to rosy purple at the eye.
64. La Belle, $\times \times \times$ July 27, 1898 (Veitch).
65. Lady Albemarle, **F.C.C.** August 2, 1876 (Veitch).
66. Princess of Wales (Veitch).
67. Rosea alba, $\times \times \times$ July 27, 1898 (Veitch).—Height 18 inches; very free flowering; flowers of good form, delicate rose deeper towards the centre.
68. The Bride (Veitch).
69. Whitneyi, $\times \times \times$ July 27, 1898 (Veitch).
70. Whitneyi Brilliant Compacta, $\times \times \times$ July 27, 1898 (Watkins & Simpson).—Height 10 inches; very free flowering; flowers of excellent form, rich crimson with a white eye. (See Vol. XXI., page 304.)

LEPTOSIPHON.

71. Aureus (Veitch).
72. Densiflorus (Veitch).
73. Densiflorus albus (Veitch).—Height 1 foot; free flowering; flowers borne in large clusters, pure white with small yellow eye.
74. Hybridus (Veitch).
75. Roseus, $\times \times \times$ July 18, 1889 (Veitch). (See Vol. XXI., page 304.)

LINARIA.

76. Aparinoides (Veitch).—Height 15 inches; flowers vary in colour from pale mauve to deep crimson.
77. Bipartita splendida (Veitch).—Height 18 inches; very free flowering; flowers purple with a paler-coloured lip; are borne on spikes 10 inches long.
78. Reticulata aurea purpurea (Veitch).—Height 8 inches; free flowering; flowers deep crimson and bright yellow.

LOBELIA.

79. *Compacta* (Carter).—Bushy habit; free flowering; flowers deep blue.

80. *Formosa* (Carter). Loose straggling habit; flowers purple.

81. *Speciosa* (Carter).—Straggling habit; free flowering; flowers blue.

82. *White Lady* (Watkins & Simpson).—Bushy habit; free flowering, flowers small pure white.

LOVE LIES BLEEDING.

83. *Love Lies Bleeding* (Watkins & Simpson). (See Vol. XXI., page 305.)

MARIGOLDS.

84. *Dwarf African Orange*, $\times \times \times$ September 5, 1889 (Veitch).

85. *Dwarf African Lemon*, $\times \times \times$ September 8, 1897 (Veitch). (See Vol. XXI., page 305.)

MIGNONETTE.

86. *Golden Machet* (R. Veitch, Watkins & Simpson). (See Vol. XXI., page 306.)

87. *Machet* (Watkins & Simpson).—Height 10 inches; compact bushy habit; free flowering; flowers dark red.

88. *Machet Salmon Red* (Watkins & Simpson). (See Vol. XXI., page 306.)

89. *White Spiral* (Watkins & Simpson).—Height 15 inches; rather slender habit; flowers white, borne on slender spikes.

MIMULUS.

90. *Mixed* (Forbes).—Straggling habit; free flowering; flowers small, of rich and varied colours.

NASTURTIUMS.

91. *Tom Thumb Carmine King* (Watkins & Simpson).—Height 8 inches; very dark leaves; very free flowering; flowers deep carmine.

92. *Tom Thumb Golden King* (Watkins & Simpson).—Height 1 foot; very free flowering; flowers lovely golden yellow, somewhat hidden by the dark green foliage.

93. Tom Thumb Lilliput Mixed (Watkins & Simpson).—A good strain of dwarf habit, the flowers varying in colour from pale yellow to deep crimson.

94. Tom Thumb Terra Cotta (Watkins & Simpson).—Height 1 foot; flowers thrown well above the foliage; colour pale terra cotta veined with purplish crimson.

PAPAVERS (POPPIES).

95. Cardinal, $\times \times \times$ July 27, 1898 (Watkins & Simpson).—A selected form of No. 96.

96. Cardinal, fl. pl. (Veitch).

97. Carnation, flowered, mixed (Veitch).—Height 2 feet 6 inches; flowers large, double; colours various.

98. Chamois Rose (Watkins & Simpson).—Height 20 inches; flowers double, soft rose.

99. Danebrog, $\times \times \times$ July 18, 1889 (Veitch).

100. Dwarf French, mixed (Veitch).—Height 2 feet; flowers large and handsome, double; colours varying from pure white through pink and rose to deep crimson.

101. Glaucum (Veitch).

102. Nudicaule, yellow (Veitch).—Beautifully cut glaucous green foliage; flowers rich yellow, borne on long stems.

102A. Nudicaule album (Veitch).—A white-flowered form of the last named.

103. Pæony-flowered, mixed (Veitch).—A fine strain with large finely formed flowers of various colours.

103A. Pavonum (Veitch).—Height 2 feet; flowers single, pale red with dark markings round the eye.

104. Shirley Hybrids, extra selected (Veitch).

105. The Bride (Veitch).

106. The Mikado (Veitch).

107. The Shirley, $\times \times \times$ September 5, 1889 (Watkins & Simpson).—Similar to No. 104.

108. Umbrosum, $\times \times \times$ July 18, 1889 (Veitch).

109. White Swan, $\times \times \times$ July 27, 1898 (Veitch). (See Vol. XXI., page 307.)

PETUNIA.

110. Grandiflora (Veitch).—Plants of spreading habit; very free flowering; flowers of medium size and varied colours.

POLYGONUM.

111. *Orientalis pumilum album* (Veitch).—Height 3 feet; very free flowering; flowers small pure white borne in drooping racemes.

RUDBECKIA.

112. *Bicolor superba* (R. Veitch).—Height 18 inches; free flowering; flowers crimson, brown, and yellow.

SALPIGLOSSIS.

113. *Crown Jewel* (R. Veitch).—Stock needs a little more selection.

114. *Variabilis superbissima*, the *Emperor* (R. Veitch).—The plants made poor growth and failed to flower.

115. *Mixed* (Sir Trevor Lawrence).—A very fine strain with large and richly coloured flowers.

SWEET PEAS.

116. *Burpee's Earliest of All* (Atlee Burpee).—Standards dark scarlet; wings creamy white.

117. *Burpee's Pink Cupid* (Atlee Burpee).—A pink-flowered form of the *White Dwarf Cupid*.

118. *Coccinea*, $\times \times \times$ July 27, 1898 (Eckford).—Flowers rosy scarlet.

119. *Dolly Varden* (Atlee Burpee).—Flowers mauve, shaded and striped with dark blue.

120. *Duchess of Westminster*, $\times \times \times$ July 27, 1898 (Eckford).—Standards soft rose; wings creamy white suffused with rose.

121. *Duke of Westminster*, $\times \times \times$ July 27, 1898 (Eckford).—Deep purple self.

122. *Eliza Eckford Cupid* (Atlee Burpee).—A Primrose-flowered form of the *White Cupid*.

123. *Fascination*, $\times \times \times$ July 27, 1898 (Eckford).—Standards mauve; wings bluish-purple.

124. *Lottie Hutchings* (Atlee Burpee).—Flowers cream-white suffused with purple.

125. *Mrs. Fitzgerald*, $\times \times \times$ July 27, 1898 (Eckford).—Flowers cream-white flushed with pink.

126. *Modesty* (Atlee Burpee).—Flowers white suffused with rose-pink.

127. Oriental, $\times \times \times$ July 27, 1898 (Atlee Burpee).—Flowers large and of great substance; colour salmon-rose with darker shadings.

128. Primrose Cupid (Atlee Burpee).—A pale Primrose-flowered form of White Cupid.

129. Saida Burpee, $\times \times \times$ July 27, 1898 (Eckford).—Flowers pure white, large and handsome. An improvement on Emily Henderson.

130. Sensation (Atlee Burpee).—Flowers white suffused with rose.

131. Stella Morse (Atlee Burpee).—Flowers white shaded with salmon.

132. Wawona (Atlee Burpee).—Flowers pale mauve shaded and striped with dark blue.

TROPEOLUM.

133. Defiance (Watkins & Simpson).—Height 1 foot; flowers borne well above the glaucous green foliage; colour intense crimson.

134. Majus Sunlight (Atlee Burpee).—Height 1 foot; spreading habit; very free flowering; flowers borne on short stems and partly hidden by the pale green leaves; colour rich buttercup-yellow.

VESCARIA.

135. *Cardinalis fulgens*, $\times \times \times$ July 27, 1898 (Watkins & Simpson). (See Vol. XXI., page 309.)

ZEA.

136. Japonica quadricolor (R. Veitch).—Long narrow green leaves striped with white and tinged with red. Useful for sub-tropical bedding.

REPORT ON MISCELLANEOUS PLANTS AND SEEDS GROWN FOR TRIAL AT CHISWICK, 1898.

ANTIRRHINUMS.

1. Crimson King (Dobbie).—Height 18 inches; spreading habit; compact spikes of deep crimson flowers.

2. Dwarf Crimson (Veitch).—Height 16 inches; bushy habit; flowers rich crimson.

3. Dwarf Scarlet (Veitch).—Height 1 foot; compact habit; very free flowering; flowers crimson-scarlet.

4. Dwarf Striped (Veitch).—Height 1 foot; flowers large and variously coloured. Stock not fixed.

5. Dwarf White (Veitch).—Height 14 inches, free flowering; flowers white.

6. Dwarf Yellow, $\times \times \times$ July 27, 1898 (Veitch).—Height 1 foot; compact habit; very free flowering; flowers large, deep yellow, borne in handsome spikes.

7. Formosa (Veitch).—Height 15 inches; bushy habit; very free flowering; flowers crimson.

8. Mixed Varieties (Forbes).—A poor selection.

9. Queen of the North (Dobbie).—Height 15 inches; compact bushy habit; very free flowering; flowers large, pure white, borne on long spikes.

10. The Bride (R.H.S.).—Similar to No. 9.

11. The Moor, $\times \times \times$ July 27, 1898 (Marshall).—Height 1 foot; very bushy habit, with very dark leaves and deep crimson flowers.

12. Yellow Queen (Dobbie).—Height 18 inches; compact habit; very free flowering; flowers large, canary-yellow.

TOM THUMB VARIETIES.

13. Crimson (Veitch).—Height 8 inches; neat habit; free flowering; flowers deep crimson.

14. Mixed (Watkins & Simpson).—Height 6 to 10 inches. A very fine strain.

15. White (Veitch).—Height 6 to 10 inches; compact habit free flowering; flowers pure white.

16. Yellow (Veitch).—Height 6 inches; bushy habit; very free flowering; flowers canary-yellow.

BEGONIA.

1. Goodyi (Goody).—A very useful free flowering variety.

CHRYSANTHEMUMS.

1. Barbara Forbes (Jap.) (Veitch).—Height 2 feet 6 inches; erect habit; free flowering; flowers white. In flower September 24.

2. California (Veitch).

3. Comtesse Foucher de Cariel (Veitch).

4. *Crimson Précocité* (Veitch).
5. *Diamond Jubilee* (Goody).—Height 20 inches; branching habit; very free flowering; flowers pale pink, lighter towards the centre. In flower September 23.
6. *Henry Yvon* (Jap.) (Veitch).—Height 2 feet; bushy habit; flowers reddish-orange, with a pale yellow reverse. In flower October 3.
7. *Lady Fitzwygram* (Veitch).
8. *Lady Selborne* (Jap.), **F.C.C.** November 8, 1881 (Veitch).—Height 3 feet 6 inches; erect branching habit; free flowering; flowers white. In flower September 6.
9. *La Vierge* (Veitch).
10. *Louis Lemaire* (Jap.), **A.M.** September 20, 1898 (Veitch).—Height 18 inches; bushy compact habit; very free flowering; flowers orange tinted with bronze. In flower September 13.
11. *Madame C. Desgranges* (Veitch).
12. *Madame Edouard Lefort* (Veitch).
13. *M. Gustave Grunnerwald* (Jap.) (Veitch).—Height 2 feet 6 inches; bushy habit; free flowering; flowers white suffused with pink. In flower September 24.
14. *Madame Marie Masse* (Veitch).
15. *Madame Zéphir Lionnet* (Veitch).
16. *Mrs. Hawkins* (Veitch).
17. *Mrs. Cullingford* (Veitch).
18. *Mychett White* (Veitch).
19. *Nellie Brown* (sport from *Ryecroft Glory*), **A.M.** October 25, 1898 (Veitch).—Height 20 inches; sturdy bushy habit; free flowering; flowers bronzy-orange with a yellow reverse. In flower October 3.
20. *October Yellow* (Veitch).
21. *O. J. Quintas* (Veitch).
22. *Queen of the Earlies*. (Jap.) (Veitch).—Height 3 feet; bushy habit; free flowering; flowers white, tinged with green in the centre. In flower September 24.
23. *Ryecroft Glory* (Veitch).
24. *Surpasse Gustave Grunnerwald*. (Jap.) (Veitch).—Height 3 feet; straggling habit; moderately free flowering; flowers rose pink. In flower September 24.
25. *Yellow Lady Selborne* (Veitch).—A yellow-flowered form of No. 8.

For description of those varieties mentioned above, but not described, see Vol. XXI, page 287.

Adverting to the trial of border Chrysanthemums (see Vol. XXI, already referred to), the plants were allowed to remain outside without protection of any kind during the winter, the object being to prove their hardiness or otherwise. They were cut down to within four inches of the ground line towards the end of November, and 27 varieties died during the winter; but although it was an unusually mild one, dense fogs were very prevalent, and these may be partly responsible for the havoc amongst the plants. The collection was very instructive this year in proving that young plants produce a better display of flowers than the old ones. The following is a list of the varieties that died:—

A. Gabey, Claret Belle, Dorcis, Edie Wright, E. Rowbottom, General Hawkes, Gloire d'Astaford, Grace Attick, Little Bob, Madame A. Nonin, Madame Eulalie Morel, Madame Léon Lassala, Madame Zéphir Lionnet, Mdle. Françoise van Leaveau, Mrs. A. J. Parker, Mons. A. Dafour, Mons. Dupuis, Mons. Foukabra, Mons. Frederick Sysmayer, M. Chanchard, Mychett White, Nanum, October Queen, October Yellow, O. J. Quintas, Sam Barlow, and The Don.

PENTSTEMONS,

Mixed (Veitch).—A fine selection. The flowers are large, abundantly produced, and the colours range from white through shades of pink, rose, lilac, to purple and deep crimson.

Named Varieties (Forbes).—A very large collection was grown, but no awards were made.

REPORT ON BEETROOT AT CHISWICK, 1898.

A collection of nine stocks of Beet were received for trial, all being sown on deeply worked but not recently manured soil on April 15. The germination of each stock was very good, and, in spite of the heat and drought, the plants grew well, and formed medium-sized handsome roots. They were examined by the Committee on October 25.

A.M.—Award of Merit.

1. Ashgrove (J. Wright).—Roots long, medium size, very even; flesh very deep red; short dark foliage.

2. Cheltenham Green-top, **A.M.** September 17, 1896 (Watkins & Simpson).—Roots moderately long or pyriform; flesh a rich blood-red, and of fine quality; foliage short and light bronze-green. One of the very best for cooking.

3. Covent Garden Red (Watkins & Simpson).—Roots pyriform, rather large; flesh red; moderate top and dark foliage.

4. Dell's Crimson, **A.M.** September 17, 1896 (J. Veitch).—Roots long, medium size, very even; flesh a rich blood-red; small top; and very dark foliage. This is often used for summer bedding on account of the colour of the foliage.

5. Dewar's Northumberland Short-top (Oliver).—Roots pyriform, medium size, very even; flesh deep blood-red; short dark foliage.

6. Dropmore Selected (Herrin).—Very similar to No. 5.

7. Nursery Beet (Long).—Roots long, rather large; flesh dark red; rather large dark foliage.

8. Pragnell's Exhibition (J. Veitch).—Roots pyriform, medium size, very even; flesh very dark blood-red; small dark foliage. A fine stock of this old well-known variety.

9. Red Globe, **A.M.** September 17, 1896 (Watkins & Simpson).—Roots globe shape, handsome, medium size; flesh very deep red and of good quality; small dark foliage.

REPORT ON MISCELLANEOUS VEGETABLES AND
FRUIT AT CHISWICK, 1898.

CANADIAN CLOVER (Philbrick).

The Committee decided this to be common Lucerne.

CARROTS.

1. Early Gem (Watkins & Simpson).
2. James Intermediate (Watkins & Simpson).
3. Long Surrey (Watkins & Simpson).

All three varieties were a practical failure this year.

CAULIFLOWER.

1. Early Market (Watkins & Simpson).
2. Midsummer Day (R. Veitch).
3. Walcherer (J. Veitch).

Owing to the heat and drought, the whole of the above buttoned prematurely.

LEEK.

The Monarch (R. Veitch).—A very sturdy variety, thick, and compact in growth.

MELON.

1. Unnamed Hardy Variety (Goody).—Seeds all failed to germinate.

2. Taunton Hero (R. Veitch).—A very handsome yellow-skinned, well-netted variety, with white flesh and of good flavour.

PARSLEY.

1. Perl Moss Curled, large variety (Watkins & Simpson).—A strong growing and finely curled form of the old type.

2. Perl Moss Curled, small variety (Watkins & Simpson).—A dwarf and compact selection of No. 1.

PARSNIP.

1. Improved Marrow (Watkins & Simpson).—Roots very long

and tapering; good shape, and usually full at the crown; small top.

2. *Lisbonnais* (Watkins & Simpson).—Roots very long, thick and tapering; good shape, hollow at the crown; large top.

SHALLOT.

Purple Exhibition (R. Veitch).—Bulbs extra large, and produced in big clusters.

TURNIP.

1. *All the Year Round* (Watkins & Simpson).—Roots round, not of good form; skin and flesh both pale yellow; large top; somewhat coarse.

2. *Covent Garden Green Globe* (Watkins & Simpson).—Roots round, of good form; skin green at the top, changing to white below; flesh white; large top. A good market variety.

3. *Covent Garden White Globe* (Watkins & Simpson).—A white form of No. 2.

4. *New Model*, **A.M.** July 26, 1898 (Watkins & Simpson).—Roots round, white; of beautiful form; flesh white and sweet; moderate top.

JOURNAL

OF THE

ROYAL HORTICULTURAL SOCIETY.

VOL. XXII. 1899.

PART IV.

FIFTH GREAT ANNUAL EXHIBITION OF BRITISH-
GROWN FRUIT.

HELD AT THE CRYSTAL PALACE, SEPTEMBER 29, 30, AND
OCTOBER 1, 1898.

NEVER probably in the memory of any living gardener has a year opened with such lavish promises of fruit, and closed with such disappointing performance. Every fruit crop, without exception, in the spring blossomed abundantly—perhaps overabundantly; and every fruit crop, with possibly the exception of Strawberries, Raspberries, and Currants, was first cut severely by the frost and cold drying winds of March and April, and subsequently dried up and parched by the quite phenomenal drought of July, August, and September. The consequence was a very small crop in everything—small in quantity and small in size of

individual fruits. Notwithstanding these very real drawbacks, the Show was larger, if not better, than any of its predecessors, excepting only that of 1895, which was an exceptionally favourable season.

In their Annual Report the Council of the Society emphasize the fact that the continuance of this particular Show from year to year rests entirely with those who are interested in British fruit production, for unless at least £100 is annually subscribed towards the Prize List the Show must be discontinued. The expenses of such a Show are unavoidably very great, and the Society has no means whatever of recouping itself for its outlay. It cannot, therefore, be too strongly insisted that those who take an interest in the Show and in the welfare of British fruit-growing must themselves put their shoulders to the wheel, and help to bear the burden by subscribing at least £100 towards the prizes. This year (1898) two entirely new divisions were added to the Schedule, one for Market Growers, and one for Apples and Pears from special groups of counties. Indeed, in every division there is a manifest tendency to increase Classes and Prizes, making it only the more necessary for all who are interested in the subject, whether Fellows or not, to join with the Council in providing the necessary financial support for this Show. Subscriptions for the 1899 Show should be sent at once to the Secretary, R.H.S. Office, 117 Victoria Street, Westminster. The following is the

LIST OF SUBSCRIBERS TO THE PRIZE FUND, 1898.

	£	s.	d.
Balderson, H., Corner Hall, Hemel Hempstead	1	1	0
Bartrum, Rev. Dr., Wakes-Colne, Essex	0	10	6
Basham, J., Bassaleg	0	10	6
Becker, H., Imperial Nurseries, Jersey	1	1	0
Bunyard & Co., George, The Royal Nurseries, Maidstone	10	10	0
Bythway, Major, Warborough, Llanelly	1	1	0
Cheal, J., & Sons, Lowfield Nurseries, Crawley	2	2	0
Clinch, T., Key St., Sittingbourne	0	2	0
Colman, J., Gatton Park, Reigate	2	2	0
Coode, R. G., Polapit Tamar, Launceston	1	1	0
Cooper, F., Birdhyrst, Norwood	0	10	0
Courtauld, S., Bocking Place, Braintree	1	1	0
Day, Jas., Galloway House Gardens, Garliestown	0	7	6
Dowie, John, Johannesburg, S. Africa	1	1	0
Dunn, Malcolm, Dalkeith Palace Gardens, N.B.	2	2	0
Edwards, R., Beechey Lees, Sevenoaks	0	5	0

	£	s.	d.
Fennell, Geo., Fairlawn Gardens, Tonbridge	0	5	0
Galpin, W., Horwood, Wincanton	0	5	0
Greaves, Benj., Broome Hall Gardens, Dorking	0	4	0
Green, H., Godlands, Maidstone	1	0	0
Haywood, T. B., Woodhatch, Reigate	2	2	0
Hill, D., Herga, Watford	0	10	6
Horne, W., Cliffe, near Rochester	2	2	0
Kay, Peter, Claigmar, Finchley	1	1	0
Kemp, A., Coolhurst Gardens, Horsham	0	5	0
Leaver, C. D'A., Thurlaston Holt, Hinckley	1	0	0
Lindley, Miss, Blackheath, S.E.	2	2	0
Low & Co., H., Bush Hill Park, N.	2	2	0
McIndoe, J., Hutton Hall Gardens, Guisborough	1	0	0
McKenzie, J., Linton, Maidstone	0	10	6
Merryweather, H., Southwell	2	15	0
Michael, W. A., The Hermitage, East Liss, Hants	0	5	0
Monro, Geo., Covent Garden Market, W.C.	2	2	0
Pearson & Sons, J. R., Chilwell, Notts	1	15	0
Pearson, H. J., Beeston, Notts	2	2	0
Peed & Sons, J., Roupell Park Nurseries, West Norwood, S.E.	2	2	0
Rivers & Son, T., Sawbridgeworth, Herts	5	5	0
Ross, C., Welford Park Gardens, Newbury	0	10	6
Rothschild, Leopold de, New Court, St. Swithin's Lane, E.C.	3	3	0
Savory, Rev. Canon, Binfield, Bracknell	0	10	0
Schröder, Baron, The Dell, Staines	5	0	0
Shea, C. E., The Elms, Foot's Cray	1	0	0
Sherwood, N., Streatham	1	1	0
Slogrove, William, Gatton, Reigate	0	5	0
Smith, Edwin, Ingleside, Chatham	1	1	0
Smith, Martin R., Warren House, Hayes, Kent	2	2	0
Spooner & Sons, S., Hounslow	1	1	0
Sutton & Sons, Reading	5	0	0
Sydenham, R., Tenby Street, Birmingham	1	1	0
Taylor, Thomas, Old Kent Road, S.E.	0	10	6
Thomas, Owen, Royal Gardens, Windsor	1	1	0
Tidy, W., Stanmore Hall Gardens, Middlesex	0	5	0
Turton, T., Maiden Erlegh, Reading	0	10	6
Veitch & Sons, J., Royal Exotic Nurseries, Chelsea	5	0	0
Wallace, L. A., Sanderstead	5	0	0
Walker, J., Ham Common, Surrey	1	1	0
Wastenobie, —, Market Harborough	3	0	0
White, Mrs. Walton Hall, Kelso, N.B.	1	0	0
Wells, H. C., Broomfield Lodge, Chelmsford	1	1	0
Wingfield, A. H., Ampthill	1	1	0
Winwood, H., Ashtown Ribble, Preston	0	5	0
Wood, W., & Sons, Wood Green, N.	5	0	0
Woodward, Geo., Barham Court Gardens, Teston, Maidstone	1	0	0
Wyatt, A., Hatton, Middlesex	0	10	6
Wythes, Geo., Syon House Gardens, Brentford	1	1	0

The following table may be interesting as comparing the number of dishes of each fruit exhibited in each of the five years during which the Show has been held. Only the exhibits entered for competition under the schedule have been included

in it, as it is impossible to enumerate everything shown by free-lances not for competition.

Dishes of	1894	1895	1896	1897	1898
Apples . . .	1,027	1,938	1,083	1,485	1,494
Apricots . . .	2	1	1	1	1
Bananas . . .	—	1	—	—	—
Blackberries . . .	—	—	—	—	1
Bullaces . . .	5	3	1	3	1
Cherries . . .	7	12	6	1	1
Currants . . .	—	—	—	—	2
Damsons . . .	6	18	4	5	15
Figs . . .	4	9	7	26	10
Gooseberries . . .	1	—	—	—	2
Grapes . . .	105	97	135	120	115
Medlars . . .	—	2	3	5	4
Melons . . .	—	10	7	8	5
Nectarines . . .	15	18	4	11	29
Nuts . . .	—	26	19	10	14
Passiflora . . .	—	—	1	1	—
Peaches . . .	51	80	24	77	96
Pears . . .	829	779	795	677	694
Pines . . .	—	—	5	3	1
Plums . . .	90	101	38	115	214
Quinces . . .	6	14	17	1	2
Raspberries . . .	—	—	—	—	2
Strawberries . . .	—	—	—	—	2
Tomatos . . .	—	67	2	3	6
Total . . .	2,148	3,176	2,152	2,552	2,711
Entries for com- petition . . .	1,301	1,783	1,234	1,329	1,332
Visitors . . .	23,680	36,293	26,499	27,242	29,281

For the following table we are indebted to the kindness of the Editor of the *Gardeners' Magazine* :—

APPLES.

Varieties	Dishes			Varieties	Dishes		
	1898	1897	1896		1898	1897	1896
Cox's Orange Pippin	89	66	75	The Queen	33	27	20
Ribston Pippin	73	73	61	Bismarck	32	21	22
Warner's King	70	56	41	Cox's Pomona	30	38	27
Peasgood's Nonesuch	63	39	33	Gascoyne's Scarlet	29	22	16
Worcester Pearmain	51	42	31	New Hawthornden	29	10	11
Lord Derby	40	34	27	Mère de Menage	29	20	21
Blenheim Orange	39	43	28	Lord Suffield	28	25	15
King of the Pippins	38	52	45	Baumann's Red	27	22	18
Ecklinville Seedling	35	30	12	Stirling Castle	25	20	12
Bramley's Seedling	34	33	17	Stone's, or Lodding-			
Lane's Prince Albert	34	32	33	ton	24	21	18

APPLES—*continued.*

Varieties	Dishes			Varieties	Dishes		
	1898	1897	1896		1898	1897	1896
Dumelow's Seedling	22	...	25 ... 18	Autumn Pearmain	...	3 ... 4 ... 1	
Newton Wonder	...	22 ... 10 ... 12		Dutch Codlin	...	3 ... 2 ... 2	
Alfriston	...	20 ... 19 ... 15		Nelson Codlin	...	3 ... 0 ... 0	
American Mother	...	20 ... 19 ... 17		Red Bietigheimer	...	3 ... 1 ... 3	
Emperor Alexander	19	...	27 ... 34	Small's Admirable	...	3 ... 2 ... 2	
Beauty of Kent	...	27 ... 22 ... 8		Striped Beefing	...	3 ... 7 ... 5	
Cellini	...	16 ... 23 ... 21		Yellow Ingestrie	...	3 ... 3 ... 13	
Lady Henniker	...	16 ... 13 ... 5		Bedfordshire Foundling	2	...	2 ... 1
Tower of Glamis	...	16 ... 18 ... 12		Cornish Aromatic	...	2 ... 1 ... 1	
Wealthy	...	16 ... 11 ... 4		Cornish Giant	...	2 ... 1 ... 0	
Golden Noble	...	15 ... 20 ... 19		Cornish Gilliflower	...	2 ... 0 ... 0	
Margil	...	15 ... 16 ... 13		Dewdney's Seedling	...	2 ... 0 ... 0	
Frogmore Prolific	...	14 ... 11 ... 4		Duchess' Favourite	...	2 ... 4 ... 4	
Pott's Seedling	...	14 ... 22 ... 14		Foster's Seedling	...	2 ... 2 ... 1	
Sandringham	...	13 ... 16 ... 12		Greasy Pippin	...	2 ... 0 ... 0	
Washington	...	13 ... 14 ... 13		Hollandbury	...	2 ... 0 ... 0	
Grenadier	...	12 ... 6 ... 5		Melon Apple	...	2 ... 0 ... 0	
Lady Sudeley	...	12 ... 7 ... 2		Manks Codlin	...	2 ... 0 ... 0	
Spencer's Favourite	12	...	14 ... 2	Northern Dumpling	...	2 ... 0 ... 0	
Allington Pippin	...	11 ... 4 ... 1		Northern Greening	...	2 ... 1 ... 0	
Fearn's Pippin	...	11 ... 20 ... 17		Okera	...	2 ... 0 ... 0	
Royal Jubilee	...	11 ... 5 ... 8		Reinette d'Osnabruck	2	...	0 ... 0
Tyler's Kernel	...	11 ... 8 ... 5		Roundway Magnum			
Adams' Pearmain	...	10 ... 8 ... 4		Bonum	...	2 ... 2 ... 0	
Egremont Russet	...	9 ... 5 ... 1		Seaton House	...	2 ... 2 ... 2	
Mannington Pearmain	9	...	7 ... 6	Vicar of Beighton	...	2 ... 3 ... 1	
Claygate Pearmain	...	8 ... 7 ... 8		Yorkshire Greening	...	2 ... 1 ... 1	
Gloria Mundi	...	8 ... 8 ... 14		Beauty of Hants	...	1 ... 2 ... 4	
King of Tompkins				Beauty of Stoke	...	1 ... 0 ... 0	
County	...	8 ... 8 ... 2		Belle de Boskoop	...	1 ... 0 ... 0	
Belle Dubois	...	7 ... 5 ... 0		Betty Geeson	...	1 ... 2 ... 1	
Brownlee's Russet	...	7 ... 9 ... 7		Betty Boston	...	1 ... 0 ... 0	
Court Pendu Plat	...	7 ... 16 ... 12		Bowhill Pippin	...	1 ... 0 ... 0	
Duke of Devonshire	7	...	1 ... 3	Braddick's Nonpareil	...	1 ... 2 ... 4	
Golden Spire	...	7 ... 9 ... 10		Calville Rouge Précoce	...	1 ... 3 ... 4	
Mrs. Barron	...	7 ... 3 ... 3		Castle Major	...	1 ... 2 ... 1	
Reinette de Canada	7	...	5 ... 5	Catshead	...	1 ... 1 ... 1	
Scarlet Nonpareil	...	7 ... 2 ... 11		Chelmsford Russet	...	1 ... 0 ... 0	
Sturmer Pippin	...	7 ... 2 ... 11		Chelmsford Wonder	...	1 ... 0 ... 0	
Cockle's Pippin	...	6 ... 1 ... 3		Christmas Pippin	...	1 ... 0 ... 0	
New Northern Greening	6	...	5 ... 4	Crimson Quoining	...	2 ... 0 ... 0	
Yorkshire Beauty	...	6 ... 7 ... 1		Devonshire Quarrenden	...	1 ... 7 ... 1	
Allen's Everlasting	...	5 ... 3 ... 1		Duchess of Gloucester	...	1 ... 4 ... 0	
Annie Elizabeth	...	5 ... 8 ... 6		Duchess of Oldenburg	...	1 ... 0 ... 0	
Lord Grosvenor	...	5 ... 10 ... 6		Duke of Gloucester	...	1 ... 0 ... 0	
Belle de Pontoise	...	4 ... 2 ... 5		Dutch Mignonne	...	1 ... 0 ... 0	
Gold Medal	...	4 ... 3 ... 2		Evargil	...	1 ... 1 ... 0	
Gravenstein	...	4 ... 5 ... 4		Farmer's Seedling	...	1 ... 1 ... 1	
Hormead Pearmain	4	...	4 ... 6	Flanders Pippin	...	1 ... 1 ... 1	
Tibbett's Pearmain	4	...	2 ... 3	Gospatrik	...	1 ... 1 ... 0	
Twenty Ounce	...	4 ... 3 ... 3		Greenup's Pippin	...	1 ... 2 ... 0	
Waltham Abbey Seedling	...	5 ... 6 ... 8		Harvey's Wiltshire De-			
Mabbott's Pearmain	5	...	5 ... 9	fiance	...	1 ... 2 ... 1	
				Hawthornden (Old)	...	1 ... 5 ... 0	

APPLES—continued.

Varieties	Dishes			Varieties	Dishes		
	1898	1897	1896		1898	1897	1896
Hoary Morning ...	1	3	6	Sedgemere Reinette ...	1	0	0
James Grieve ...	1	2	1	Smart's Prince Arthur	1	1	0
Jolly Beggar ...	1	0	0	Succombe's Seedling...	1	0	0
Kentish Pippin ...	1	3	1	Sultan ...	1	0	0
Keswick Codlin ...	1	3	2	Summer Strawberry ...	1	0	0
Lady Falsworth ...	1	0	0	Thomas Rivers ...	1	0	0
Lemon Pippin ...	1	0	0	Tibbett's Incomparable	1	0	0
Magnum Bonum ...	1	0	0	Tom Putt ...	1	2	1
Norfolk Beefing ...	1	0	0	Transparent de Cronsels	1	1	0
Round Winter Nonesuch	1	3	0	Wadhurst Pippin...	1	4	1
Royal Russet ...	1	3	0	Winter Hawthornden ...	1	0	0
St. Edmund's Pippin...	1	1	0	Winter Quoining ...	1	1	4
Scotch Bridget ...	1	0	0	Withington Fillbasket...	1	0	0

APRICOTS.

Moor Park ...	1	1	1
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BLACKBERRIES.

Rubus laciniatus ...	1	0	0
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BULLACES.

Common Bullace ...	1	3	1
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CHERRIES.

Morello ...	2	1	6
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CURRANTS.

Raby Castle ...	1	0	0
White Dutch ...	1	0	0

DAMSONS.

Prune ...	5	1	1	Frogmore Prolific ...	1	0	0
Farleigh ...	3	0	0	King of Damsons...	1	0	0
Bradley's King ...	1	0	0	Old ...	1	0	0
Chester ...	1	1	1	Shropshire Prune...	1	1	0
Common ...	1	1	1				

FIGS.

Brown Turkey ...	8	14	4	Negro Largo...	2	3	2
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GOOSEBERRIES.

Warrington ...	2	0	0
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GRAPES.

Muscat of Alexandria ...	24	24	30	Appley Towers ...	3	0	0
Alicante... ..	16	14	24	Chasselas Napoleon ...	3	3	0
Gros Maroc ...	17	14	14	Buckland Sweetwater ...	1	3	3
Black Hamburgh...	13	11	12	Duke of Buccleuch ...	1	0	0
Alnwick Seedling...	7	4	0	Gros Guillaume ...	1	3	1
Gros Colmar ...	6	9	4	Mrs. Pince ...	1	5	5
Madresfield Court...	6	8	12	Black Muscat ...	1	2	1
Foster's Seedling ...	5	6	7	Sweetwater ...	1	2	1
Lady Downe's Seedling	5	5	8	Trebbiano ...	1	1	1
Mrs. Pearson ...	4	3	3				

MELONS.

Champion ...	1	0	0	Imperial Green Flesh ...	1	0	0
Countess ...	1	0	0	Royal Favourite ...	1	0	0
Duchess of York ...	1	0	0				

MEDLARS.

Varieties	Dishes			Varieties	Dishes		
	1893	1897	1896		1893	1897	1896
Royal	2	1	0	Common	1	1	3
Dutch	1	2	0				

NECTARINES.

Pineapple	9	4	0	Rivers' Orange	2	0	0
Victoria	6	3	1	Albert Victor	1	2	0
Humboldt	5	0	0	Darwin	1	0	0
Pitmaston Orange	4	0	0	Elruge	1	1	0

NUTS.

Cobs	7	4	6	Walnuts	3	3	7
Filberts	4	2	0				

PEARS.

Pitmaston Duchess	71	46	55	Seckle	4	3	6
Williams's Bon Chrétien	42	2	0	Beurré Capiaumont	3	4	3
Doyenné du Comice	34	35	39	Beurré Rance	3	2	8
Beurré Diel	30	32	38	Brockworth Park	3	7	8
Durondeau	30	26	36	Grosse Calebasse	3	4	6
Louise Bonne of Jersey	29	36	33	Dr. Jules Guyot	3	0	0
Souvenir du Congrès	29	9	12	Fondante de Thirriot	3	5	4
Beurré Hardy	23	18	24	Gansel's Bergamotte	3	10	7
Marie Louise	23	23	40	Le Lecteur	3	1	0
Doyenné Boussoch	19	15	4	Nouvelle Fulvie	3	6	8
Beurré Superfin	18	31	24	Princess	3	5	6
Duchesse d'Angoulême	16	18	28	Triomphe de Jodoigne	3	3	1
Maréchal de Cour	15	13	13	Beurré Mortillet	2	0	0
Marguerite Marillat	13	6	1	Beurré Jean van Geert	2	2	4
Beurré d'Amanlis	12	9	1	Beurré Sterckmans	2	4	2
Conference	12	8	4	Comte de Flandre	2	1	3
Emile d'Heyst	12	6	11	Flemish Beauty	2	0	0
Marie Louise d'Uccle	12	20	8	Olivier de Serres	2	4	1
Beurré Bachelier	11	17	14	President d'Osmonville	2	2	5
General Todleben	11	10	9	Autumn Bergamotte	1	1	2
Catillac	10	16	7	Autumn Nelis	1	1	1
Fondante d'Automne	10	10	5	Baronne de Mello	1	0	0
Madame Treyve	10	8	1	Beacon	1	0	0
Gratioli of Jersey	9	4	0	Belle de Bruxelles	1	1	0
Triomphe de Vienne	9	1	2	Bellisime d'Hiver	1	0	0
Thompson's	9	9	8	Beurré Benoist	1	0	0
Winter Nelis	8	14	25	Beurré Brown	1	0	0
Beurré d'Anjou	7	1	5	Beurré de Jonghe	1	2	1
Beurré Fouqueray	7	2	3	Bishop's Thumb	1	2	0
Josephine de Malines	7	17	20	Directeur Alphand	1	1	1
Uvedale's St. Germain	7	10	17	Directeur Hardy	1	1	0
Easter Beurré	6	11	20	Dr. Joubert	1	1	1
Fondante de Cuerne	6	2	0	Fertility	1	1	1
Glou Morceau	6	15	52	Forelle	1	1	3
Beurré Clairgeau	5	9	16	Gilogil	1	0	0
Beurré Dumont	5	3	1	Grégoire Bordillon	1	0	0
Comte de Lamy	5	3	1	Huyshe's Prince of Wales	1	0	0
Hacon's Incomparable	5	2	7	Jargonelle	1	2	0
Vicar of Winkfield	5	4	6	King Edward	1	0	0
Beurré Baltet Père	4	5	6	Knight's Monarch	1	0	0
Beurré Bose	4	14	14	Napoleon	1	2	3
Chaumontel	4	3	4	Nouveau Poiteau	1	4	2
Clapp's Favourite	4	0	0	Soldat Laboureur	1	2	2
Marie Benoist	4	7	5	Van Mon's Léon Leclerc	1	0	0

PINEAPPLES.

Varieties	Dishes			Varieties	Dishes		
	1898	1897	1896		1898	1897	1896
Queen	1	1	0

PEACHES.

Princess of Wales	21	9	1	Lord Palmerston	2	3	2
Sea Eagle	18	21	6	Violet Hative	2	0	0
Barrington	13	2	0	Admirable	1	0	0
Nectarine	9	4	2	Dr. Hogg	1	0	0
Walburton Admirable	6	7	1	Dymond	1	0	0
Gladstone	4	2	0	Goshawk	1	0	0
Late Admirable	4	5	1	Gregory's Late	1	0	0
Prince of Wales	3	3	0	Lady Palmerston	1	5	3
Alexandra Noblesse	2	0	0	Salway	1	4	1
Bellegarde	2	1	1	Thames Bank	1	0	0
Golden Eagle	2	4	0				

PLUMS.

Coe's Golden Drop	27	34	10	Autumn Compote	1	1	0
Jefferson's	26	4	3	Bellegarde	1	0	0
Monarch	22	9	6	Blue Impératrice	1	1	0
Pond's Seedling	22	9	1	Bonne Bouche	1	0	0
Victoria	14	3	0	Cox's Emperor	1	2	1
Kirke's	10	1	1	Coe's Violet	1	1	0
White Magnum Bonum	10	3	1	Decaisne	1	0	0
Diamond	5	0	0	Denbigh	1	0	0
Grand Duke	7	5	0	Denniston Superb	1	0	0
Reine Claude de Bavay	7	7	2	Golden	1	0	0
Bryanston Green Gage	6	5	4	Goliath	1	1	0
Red Magnum Bonum	6	3	1	Ickworth Impératrice	1	0	0
Late Transparent Gage	5	2	1	Late Black Orleans	1	0	0
Transparent Gage	5	2	0	Old Green Gage	1	0	0
Brahm's Green Gage	3	2	1	Orleans	1	0	0
Archduke	2	2	0	Prince of Wales	1	2	0
Belle de Septembre	2	1	2	Purple Gage	1	0	0
Golden Eagle	2	0	0	Rivers' Golden Trans-			
Guthrie's Late Gage	2	0	0	parent	1	0	0
Impérial de Milan	2	1	1	Royal George	1	0	0
Kentish Bush	2	0	0	Sandall	1	0	0
Prince Engelbert	2	0	0	Washington	1	2	0

QUINCES.

Pear-shaped	2	1	17
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RASPBERRIES.

Northumberland Fill-				October Red	1	0	0
basket	1	0	0				

STRAWBERRIES.

Royal Sovereign	1	0	0	St. Joseph	1	0	0
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TOMATOS.

Palmer's Triumph	2	0	0	Royal Jubilee	1	0	0
Chiswick Dessert	1	0	0	The Cropper	1	0	0
Conference	1	2	1				

OFFICIAL PRIZE LIST.

(The Gardener's name and the address are entered on the first occasion of winning a prize, but afterwards the Owner's name only is recorded.)

DIVISION I.

Fruits grown under Glass or otherwise.

Open to Gardeners and Amateurs only.

NOTE.—Exhibitors can compete in one Class only of Classes 1, 2; and of Classes 3, 4.

Class 1.—Collection of 12 dishes of Ripe Dessert Fruit :—6 kinds at least; only 1 Pine, 1 Melon, 1 Black and 1 White Grape allowed; not more than 2 varieties of any other kind, and no two dishes of the same variety.

First Prize, £7. 10s.; Second, £5.

1. Sir Joseph Pease, Bt., Guisborough (gr. J. McIndoe).
2. Earl of Harrington, Derby (gr. J. H. Goodacre).

Class 2.—Collection of 8 dishes of Ripe Dessert Fruit :—4 kinds at least; only 1 Melon, 1 Black and 1 White Grape allowed; not more than 2 varieties of any other kind, and no two dishes of the same variety. Pines excluded.

First Prize, £5; Second, £3; Third, £2.

1. M. Biddulph, Esq., M.P., Ledbury (gr. J. Dawes).
2. W. K. D'Arcy, Stanmore (gr. W. Tidy).
3. Sir Chas. Russell, Reading (gr. F. Cole).

Class 3.—Grapes, 6 distinct varieties, 2 bunches of each; both Black and White must be represented.

First Prize, £5; Second, £3; Third, £2.

1. Earl of Harrington.
2. Sir Chas. Russell.
3. C. Bayer, Esq., Forest Hill (gr. Wm. Taylor).

Class 4.—Grapes, 3 distinct varieties, 2 bunches of each.

First Prize, £2. 10s.; Second, £1. 10s.; Third, £1.

1. M. Biddulph, Esq.
2. Sir E. H. Carbutt, Cranleigh (gr. A. Belcher).
3. Mrs. F. Need, Malvern (gr. J. Jones).

Class 5.—Grapes, Black Hamburgh, 3 bunches.

First Prize, £1. 10s. ; Second, £1 ; Third, 10s.

1. Sir Chas. Russell.
2. J. W. Fleming, Esq., Romsey (gr. W. Mitchell).
3. Earl of Harrington.

Class 6.—Grapes, Madresfield Court, 3 bunches.

First Prize, £1. 10s. ; Second, £1 ; Third, 10s.

1. J. W. Fleming, Esq.
2. Mrs. Need.
3. Earl of Harrington.

Class 7.—Grapes, Gros Colmar or Gros Maroc, 3 bunches of either.

First Prize, £1. 10s. ; Second, £1 ; Third, 10s.

1. Lord Suffield, Norwich (gr. Wm. Allan).
2. J. W. Fleming.
3. Messrs. de Rothschild, Acton (gr. G. Reynolds).

Class 8.—Grapes, Alicante, 3 bunches.

First Prize, £1. 10s. ; Second, £1 ; Third, 10s.

1. Lord Suffield.
2. Sir H. Tate, Streatham (gr. W. Howe).
3. Sir Chas. Russell.

Class 9.—Grapes, Lady Downes (Black), 3 bunches.

First Prize, £1. 10s. ; Second, £1. ; Third, 10s.

1. C. Bayer, Esq.
2. Sir Marcus Samuel, Maidstone (gr. W. H. Bacon).
3. M. Biddulph, Esq.

Class 10.—Grapes, any other Black Grape, 3 bunches.

First Prize, £1. 10s. ; Second, £1 ; Third, 10s.

1. J. W. Fleming, Esq.
2. Leopold de Rothschild, Esq., Acton (gr. J. Hudson).
3. W. K. D'Arcy, Esq.

Class 11.—Grapes, Muscat of Alexandria, 3 bunches.

First Prize presented by Messrs. Wm. Wood & Sons, Wood Green.

First Prize, Marble Clock, value £5 ; Second, £1. 10s.

1. Lord Hillingdon, Uxbridge (gr. A. R. Allan). (Fig. 93.)
2. C. J. Lucas, Esq., Horsham (gr. G. Duncan).

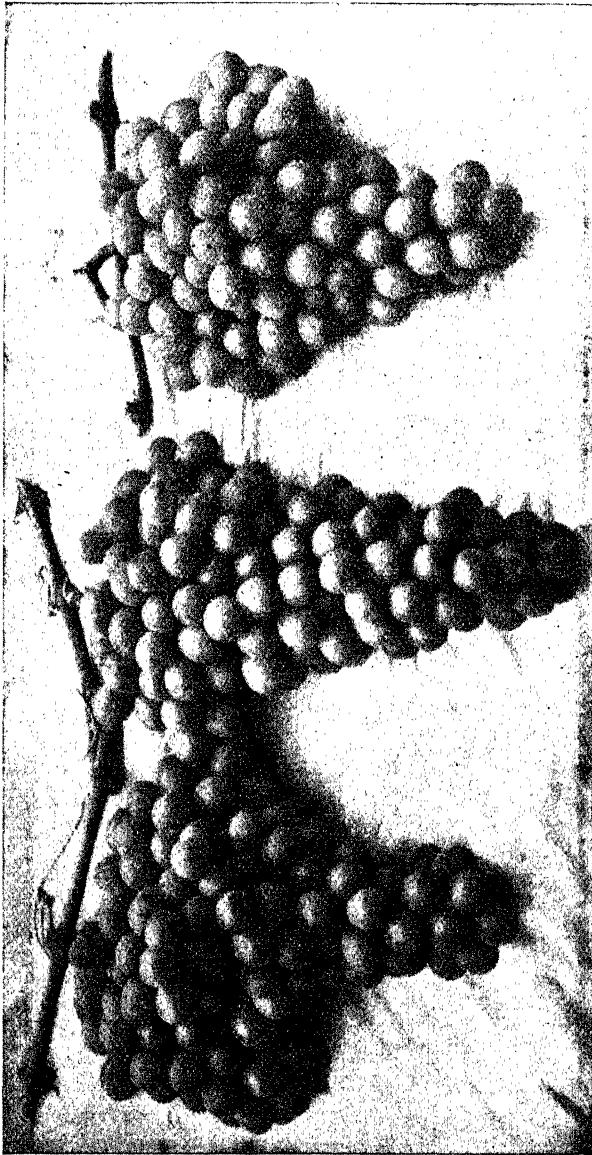


FIG. 93.—LORD HILLINGDON'S MUSCAT OF ALEXANDRIA GRAPES. (*Gardeners' Magazine.*)

Class 12.—Grapes, Mrs. Pearson.

First Prize, £2 ; Second, £1. 10s. ; Third, 15s.

1. Mrs. Wingfield, Ampthill (gr. W. J. Empson).
2. Messrs. de Rothschild.
3. Miss Ridge, Englefield Green (gr. G. Lane).

Class 13.—Grapes, any other White Grape, 3 bunches.

First Prize, £1. 10s. ; Second, £1 ; Third, 10s.

1. Messrs. de Rothschild.
2. Miss Ridge.
3. Lord Suffield.

Class 14.—Figs, 1 dish of one variety.

First Prize, 10s. ; Second, 7s.

1. J. W. Fleming, Esq.
2. Mrs. Need.

Class 15.—Collection of Hardy Fruit, not exceeding 50 dishes distinct, grown entirely in the open.

First Prize, £4. 10s. ; Second, £3.

1. Sir Mark Collet, Bt., Sevenoaks (gr. R. Potter).
2. Col. Brymer, Dorchester (gr. J. Powell).

Class 16.—Collection of Hardy Fruit, not exceeding 36 dishes distinct, grown partly or entirely under glass to illustrate Orchard House Culture.

First Prize, £4. 10s. ; Second, £3.

1. Sir Mark Collet, Bt.
2. Sir Joseph Pease, Bt.

DIVISION II.

Open to Nurserymen only.

NOTE.—As in all other Divisions, so also in Division II., all the Exhibits must have been grown by the Exhibitor. Exhibitors may not compete in both Class 19 and Class 20. In this Division the number of Fruits is not limited, and the baskets or dishes may, if desired, be of a size not exceeding 15 inches in diameter if circular, or 19 in. by 15 in. if rectangular.

Class 17.—Collection of Fruit Trees bearing Fruit, in pots.

Prizes, Gold, Silver Gilt, or Silver Medals.

N.B.—Gathered Fruit and Nuts may be placed in the space between the pots, but will not be taken into account by the Judges.

1. Messrs. Rivers and Son, Sawbridgeworth, Gold Medal.

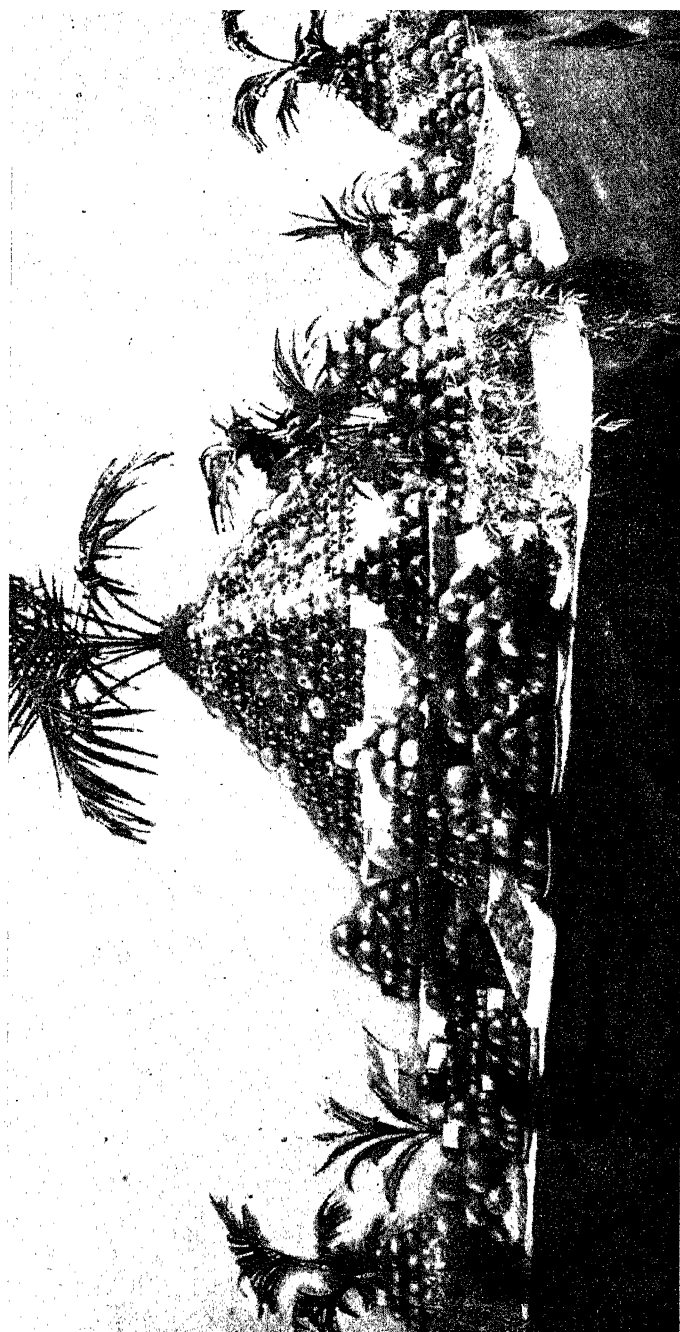


FIG. 94.—MESSRS. BUNYARD'S PRIZE COLLECTION, CLASS 19. (*Gardeners' Magazine.*)

Class 18.—Collection of Hardy Fruits, grown partly or entirely under glass, to illustrate Orchard House Culture.

Prizes, Gold, Silver Gilt, or Silver Medals.

1. Messrs. Geo. Bunyard & Co., Maidstone, Gold Medal.

Class 19.—Collection of not less than 75, or more than 100 distinct varieties of Hardy Fruits, in baskets or dishes, grown entirely in the open air; to be arranged on a table of about 24 ft. by 6 ft. or an equivalent space. Foliage plants may be added and branches of any fruit-bearing trees or bushes. (Fig. 94.)

Prizes, Gold or Silver Gilt, or Silver Medals.

1. Messrs. G. Bunyard & Co., Maidstone, Hogg Memorial Medal. (Fig. 95.)
2. Mr. H. Berwick, Sidmouth, Silver Gilt Knightian Medal.



FIG. 95.—THE 'ROBERT HOGG' MEMORIAL MEDAL. (*Journal of Horticulture*.)

Class 20.—Collection of not less than 30, or more than 50 distinct varieties of Hardy Fruits, in baskets or dishes, grown entirely in the open air; to be arranged on a table of about 24 ft. by 3 ft. or an equivalent space. Foliage plants may be added and branches of any fruit-bearing trees or bushes.

Prizes, Silver Gilt or Silver Medals.

1. Mr. G. Mount, Canterbury, Silver Gilt Knightian Medal.
2. Mr. J. Colwill, Sidmouth, Silver Gilt Banksian Medal.
3. Mr. J. Basham, Newport, Mon., Silver Banksian Medal.

Class 21.—Collection of from 30 to 36 distinct varieties of Pears, in baskets or dishes, grown entirely in the open air; to be arranged on a table of about 24 ft. by 3 ft. or an equivalent space. Foliage plants may be added and branches of any fruit-bearing trees or bushes.

Prizes, Silver Gilt or Silver Medals.

1. Mr. H. Berwick, Silver Knightian Medal.

Class 22.—Collection of 50 distinct varieties of Apples, in baskets or dishes, grown entirely in the open air; to be arranged on a table of about 24 ft. by 3 ft. or an equivalent space. Foliage plants may be added and branches of any fruit-bearing trees or bushes.

Prizes, Silver Gilt or Silver Medals.

1. Mr. J. Colwill, Silver Gilt Knightian Medal.
2. Mr. J. Basham, Silver Gilt Banksian Medal.
3. Messrs. Paul & Son, Cheshunt, Silver Banksian Medal.

DIVISION III.

Open to Market Growers only.

NOTE.—Gentlemen's gardeners or amateurs, who sell surplus fruit, and nurserymen, are excluded from this Division. All the fruit exhibited must have been grown by exhibitor or his employer, and must be shown "as for market," except that all lids, covering paper, and other surface packings are to be turned back (not removed), so as to display contents. Other things being equal, a sieve or bushel of Apples or Pears will be considered to weigh about 42 lb. and a half-sieve or half-bushel 20 lb., or of Plums 28 lb. The Judges will be men thoroughly conversant with the market, and in awarding the prizes they will be instructed to consider not only the quality of the fruit, but also the packing, the grading, and the suitability for market purposes of the box, basket, or other receptacle in which the fruit is shown. The winner of any prize will have the option of a medal of kindred value instead of money, if he prefer it.

Class 23.—Grapes, Hamburgh, a single layer, weighing not less than 12 lb. in a baby basket.

First Prize, £2; Second, £1. 10s.

No Awards.

Class 24.—Grapes, Black, any variety except Hamburgs, a single layer weighing not less than 12 lb., in a baby basket.

First Prize, £2; Second, £1. 10s.

1. Messrs. Wells, Hounslow.

Class 25.—Grapes, White, any variety, a single layer, weighing not less than 12 lb., in a baby basket.

First Prize, £2; Second, £1. 10s.

No Awards.

Class 26.—Grapes, any variety, in any other package than a baby basket, for market.

No prize to be awarded unless the Judges consider the box, basket, or other receptacle superior for transit by rail to baby baskets in flats.

First Prize, £2; Second, £1. 10s.

1. Mr. J. Gore, Polegate.

Class 27.—Apples, Cooking, 4 varieties, about 42 lb. net of each, in baskets or boxes.

First Prize, £1. 10s.; Second, £1.

1. Mr. E. Basham. (Fig. 96.)

2. Mr. A. Wyatt, Hounslow.

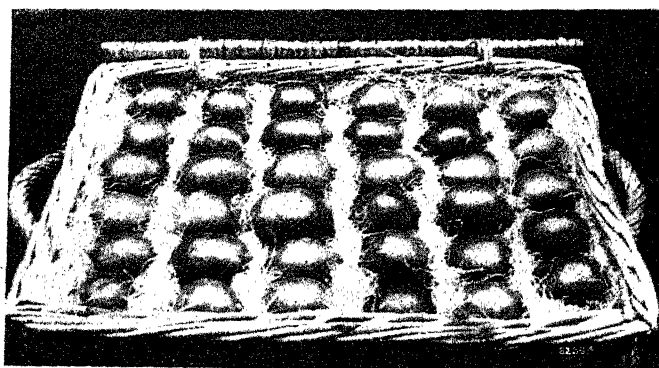


FIG. 96.—ONE OF THE PRIZE BASKETS OF APPLES. (*Gardeners' Magazine*.)

Class 28.—Apples, Dessert, 4 varieties, about 20 lb. net of each, in baskets or boxes.

First Prize, £1. 10s.; Second, £1.

1. Mr. A. Wyatt.

2. Mr. G. Tebbutt, Isleworth.

Class 29.—Apples, Cooking, any one variety, about 42 lb. net. in a basket or box.

First Prize, 15s.; Second, 10s.

1. Mr. G. Tebbutt.

2. Mr. A. Wyatt.

Class 30.—Apples, Dessert, any one variety, about 20 lb. net, in a basket or box.

First Prize, 15s.; Second, 10s.

1. Mr. McKenzie Bradley, Meopham.

2. Mr. Jas. Jenner, Tonbridge.

Class 31.—Apples, about 42 lb. net of any one variety in any improved form of package for market.

No prize to be awarded unless the Judges consider the box, basket, or other receptacle superior to those in ordinary use.

First Prize, £1; Second, 15s.

No Awards.



FIG. 97.—ONE OF THE PRIZE BOXES OF PEARS. (*Gardeners' Magazine*.)

Class 32.—Apples, about 42 lb. net of any one variety showing any improved system of packing.

First Prize, £1; Second, 15s.

No Awards.

Class 33.—Pears, 2 varieties in 2 packages of about 20 lb. capacity each.

First Prize, £1; Second, 15s.

1. Mr. A. Wyatt.

2. Mr. G. Tebbutt.

Class **34**.—Pears, from 24 to 48 fruits, according to size, of any one choice dessert variety, suitably packed in one package for market.

First Prize, 15s. ; Second, 10s.

1. Mr. A. Wyatt. (Fig. 97.)
2. Messrs. Wells.

Class **35**.—Plums, Cooking, a basket or box of about 28 lb. capacity of any one variety.

First Prize, 15s. ; Second, 10s.

1. Mr. G. Tebbutt.

Class **36**.—Plums, from 24 to 48 fruits of any choice dessert variety, suitably packed in one package for market.

First Prize, 15s. ; Second, 10s.

No Awards.

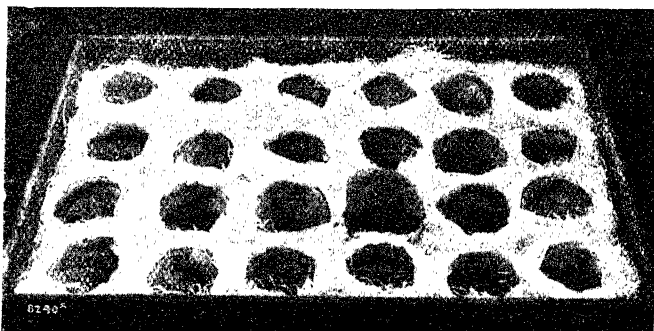


FIG. 98.—PRIZE BOX OF PEACHES. (*Gardners' Magazine*.)

Class **37**.—Damsons, a basket or box of about 28 lb. of any variety.

First Prize, 15s. ; Second, 10s.

1. Mr. A. Wyatt.

Class **38**.—Peaches, 24 fruits of one or more varieties, packed in a suitable box.

First Prize, £1. 10s. ; Second, £1.

Superiority of the packing and of the system of packing to be especially considered in this class.

1. Mr. J. Gore. (Fig. 98.)

Class 39.—Filberts or Cobs, about 20 lb., suitably packed.

First Prize, 15s.; Second, 10s.

1. Mr. J. Jenner, Tonbridge.
2. Mr. J. Durling, Ightham, Kent.

Class 40.—Tomatos, a basket or box of about 12 lb. capacity, suitably packed.

First Prize, 15s.; Second, 10s.

1. Mr. J. Gore.
2. Flower and Fruit Company, Frome.

Class 41.—Cucumbers, a flat containing from 2 to 3 dozen Fruits.

First Prize, 15s.; Second, 10s.

No Awards.

Class 42.—Melons, a suitable package containing 3 Fruits.

First Prize, 15s.; Second, 10s.

No Awards.

DIVISION IV.

Fruits grown in the open air.

Open to Gardeners and Amateurs only (Nurserymen and Market Gardeners excluded).

NOTE.—Exhibitors can compete in one Class only of the Classes, 43, 44, 45; of 46, 47; of 48, 49; of 50, 51, 52, 53; of 54, 55; of 56, 57; of 58, 59; of 60, 61; of 63, 64 (see Rule VII., p. 31). In distinguishing Dessert and Cooking Varieties, see Official List.

Class 43.—Apples, 24 dishes distinct, 16 Cooking, 8 Dessert. The latter to be placed in the front row.

First Prize, £4; Second, £2; Third, £1. 10s.

1. Roger Leigh, Esq., Maidstone (gr. G. Woodward).

Class 44.—Apples, 12 dishes distinct, 8 Cooking, 4 Dessert. The latter to be placed in the front row.

First Prize, £2; Second, £1; Third, 15s.

1. J. W. Startup, Esq., Maidstone (gr. B. Miller).
2. J. K. D. W. Digby, Sherborne (gr. W. G. Pragnell).
3. Mr. G. Chambers, Maidstone.

Class 45.—Apples, 9 dishes distinct, 6 Cooking, 3 Dessert.
The latter to be placed in the front row.

First Prize, £1. 10s.; Second, 15s.; Third, 10s.

1. M. Biddulph, Esq.

2. Mrs. Crawford, Reigate (gr. W. Slogrove).

3. J. T. Charlesworth, Esq., Red Hill (gr. T. W. Herbert).

Class 46.—Cooking Apples, 6 dishes distinct.

First Prize, £1; Second, 15s.

1. Roger Leigh, Esq.

2. B. H. Hill, Esq., Crediton (gr. G. Lock).

Class 47.—Cooking Apples, 3 dishes, distinct.

First Prize, 10s.; Second, 7s.

1. Colonel H. Walpole, Winchfield (gr. A. Maxim).

2. Mr. J. Lee, Bebington.

Class 48.—Dessert Apples, 6 dishes, distinct.

First Prize, £1; Second, 15s.

1. Roger Leigh, Esq.

2. T. W. Startup, Esq.

Class 49.—Dessert Apples, 3 dishes, distinct.

First Prize, 10s.; Second, 7s.

1. A. J. Howard, Esq., Isleworth (gr. A. Pentney).

2. E. Dresden, Esq., Bury St. Edmunds (gr. J. C. Tallack).

Class 50.—Dessert Pears, 12 dishes, distinct.

First Prize, £2. 15s.; Second, £1. 15s.; Third, £1.

1. Roger Leigh, Esq.

2. Lord Suffield.

3. Sir Marcus Samuel.

Class 51.—Dessert Pears, 9 dishes, distinct.

First Prize, £2; Second, £1; Third, 15s.

1. J. K. D. W. Digby, Esq.

2. Colonel Brymer.

3. J. R. Brougham, Esq., Carshalton (gr. W. Jones).

Class 52.—Dessert Pears, 6 dishes, distinct.

First Prize, £1. 10s.; Second, 15s.

1. Marquis Camden, Lamberhurst (gr. G. H. Sage).

2. Major Heneage, V.C., Calne (gr. W. A. Cook).

Class 53.—Dessert Pears, 3 dishes, distinct.

First Prize, 15s.; Second, 10s.

1. G. H. Field, Esq., Sevenoaks (gr. R. Edwards).
2. W. M. Cazalet, Esq., Tonbridge (gr. G. Fennell).

Class 54.—Cooking Pears, 3 dishes, distinct.

First Prize, 15s.; Second, 10s.

1. Roger Leigh, Esq.
2. Sir Marcus Samuel.

Class 55.—Cooking Pears, 1 dish of 1 variety.

First Prize, 7s.; Second, 5s.

1. Sir Mark Collet, Bart.
2. Colonel Brymer.

Class 56.—Peaches, 3 dishes, distinct.

First Prize, £1. 10s.; Second, £1; Third, 10s.

1. Roger Leigh, Esq.
2. Colonel H. Walpole.
3. A. J. Howard, Esq.

Class 57.—Peaches, 1 dish of 1 variety.

First Prize, 10s.; Second, 7s.

1. Earl Percy, Brentford (gr. G. Wythes).
2. Lord Field, Englefield Green (gr. T. H. Wren).

Class 58.—Nectarines, 3 dishes, distinct.

First Prize, £1. 10s.; Second, £1; Third, 10s.

1. Roger Leigh, Esq.
2. O. E. A. d'Avigdor-Goldsmid, Esq., Tonbridge (gr. Ch. Earl).
3. Colonel H. Walpole.

Class 59.—Nectarines, 1 dish of 1 variety.

First Prize, 10s.; Second, 7s.

1. G. W. Bird, Esq., West Wickham (gr. H. Redden).

Class 60.—Plums, 4 dishes, of dessert, distinct.

First Prize, £1; Second, 15s.

1. Lord Braybrooke, Saffron Walden (gr. J. Vert).
2. J. Colman, Esq., Reigate (gr. W. King).

Class 61.—Plums, 1 dish of dessert of 1 variety, not Gages.

First Prize, 7s.; Second, 5s.

No First.

2. Lord Carnarvon, Newbury (gr. W. Pope).

Class 62.—Gage Plums, 1 dish.

First Prize, 7s.; Second, 5s.

1. J. Colman, Esq.

2. Colonel Brymer.

Class 63.—Plums, 4 dishes of cooking, distinct.

First Prize, £1; Second, 15s.

1. Lord Carnarvon.

2. Lord Braybrooke.

Class 64.—Plums, 1 dish of cooking of 1 variety.

First Prize, 7s.; Second, 5s.

1. Duchess of Cleveland, Battle Abbey (gr. W. Camm).

2. Hon. W. Lowther, Wickham Market (gr. A. Andrews).

Class 65.—Damsons, Prunes, and Bullaces, 4 dishes, distinct.

First Prize, 15s.; Second, 10s.

1. W. M. Cazalet, Esq.

2. Mrs. Wingfield.

DIVISION V.

Special District County Prizes.

Open to Gardeners and Amateurs only.

All fruit to be grown in the open.

N.B.—Exhibitors in Division V. must not compete in Divisions I., II., III., or in Classes 43, 44, 45, 48, 50, 51.

Class AA.—Apples, 6 dishes distinct, 4 cooking, 2 dessert.

First Prize, £1 and third-class Single Fare from Exhibitor's nearest railway station to London; Second, 15s. and Railway Fare as above.

Class BB.—Dessert Pears, 6 dishes distinct.

First Prize, £1. 10s. and Railway Fare as above; Second, £1 and Railway Fare as above.

Class 66.—Open only to Kent Growers.

A.A.

1. Mr. Stowers, Sittingbourne.
2. Marquis Camden, Lamberhurst (gr. G. H. Sage).

B.B.

1. Marquis Camden.

Class 67.—Open only to Growers in Surrey, Sussex, Hants, Dorset, Somerset, Devon, and Cornwall.

A.A.

1. Duchess of Cleveland.
2. B. H. Hill, Esq.

B.B.

1. Mrs. Crawford.
2. H. Padwick, Esq., Horsham (gr. J. Webb).

Class 68.—Open only to Growers in Wilts, Gloucester, Oxford, Bucks, Berks, Beds, Herts, and Middlesex.

A.A.

1. Mrs. Nicol, Reading (gr. T. Turton).
2. Mrs. Wingfield.

B.B.

1. Major Heneage, V.C.
2. F. M. Lonergan, Esq., Reading (gr. R. Chamberlain).

Class 69.—Open only to Growers in Essex, Suffolk, Norfolk, Cambridge, Hunts, and Rutland.

A.A.

1. H. H. Hurnard, Esq., Hingham.
2. E. Dresden, Esq.

B.B.

1. Hon. W. Lowther.
2. J. W. Melles, Esq., Chingford (gr. J. Nicholson).

Class 70.—Open only to Growers in Lincoln, Northampton, Warwick, Leicester, Notts, Derby, Staffs, Shropshire, and Cheshire.

A.A.

1. Mr. J. Lee, Bebington.
2. Duke of Rutland, Grantham (gr. W. H. Divers).

B.B.

1. Mr. T. Bennett, Market Drayton.
2. Duke of Rutland.

Class 71.—Open only to Growers in Worcester, Hereford, Monmouth, Glamorgan, Carmarthen, and Pembroke.

A.A.

1. Mr. R. M. Whiting, Hereford.

Class 72.—Open only to Growers in the other Counties of Wales.

A.A.

1. Dow. Lady William Wynn, Denbigh.
2. Mr. L. P. Pugh, Aberystwith.

B.B.

1. Dow. Lady William Wynn.
2. Mr. L. P. Pugh.

Class 73.—Open only to Growers in the six northern Counties of England and in the Isle of Man.

A.A.

1. Earl of Harewood, Leeds (gr. J. Jeffrey).
2. Mr. R. J. Hird, Liverpool.

Class 74.—Open only to Growers in Scotland.

A.A.

1. Earl of Galloway, Garliestown (gr. J. Day).

B.B.

1. Earl of Galloway.

Class 75.—Open only to Growers in Ireland.

DIVISION VI.

SINGLE DISHES OF FRUIT GROWN IN THE OPEN AIR.

Open to Gardeners and Amateurs only.

Nurserymen and Market Gardeners excluded.

DESSERT APPLES.

Prizes in each Class (except 106 and 124) 1st, 7s. ; 2nd, 5s.

Class 76.—Adams' Pearmain.

1. B. H. Hill, Esq.
2. Duchess of Cleveland.

Class 77.—Allen's Everlasting.

1. E. J. Johnstone, Esq., Bury St. Edmunds (gr. H. Henley).
2. Col. Brymer.

Class 78.—Allington Pippin. (Fig. 99.)

1. Roger Leigh, Esq.
2. Col. Brymer.

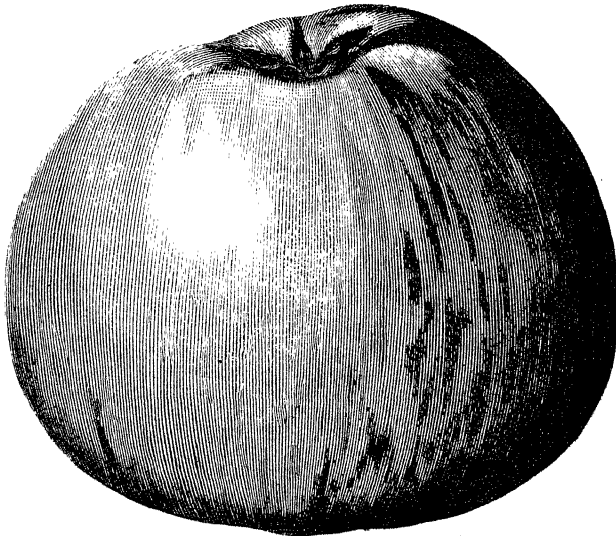


FIG. 99.—APPLE, ALLINGTON PIPPIN. (*Journal of Horticulture*.)

Class 79.—Baumann's Red Winter Reinette.

1. Roger Leigh, Esq.
2. Mrs. Crawford.

Class 80.—Blenheim Orange.

1. Lord Poltimore, Exeter (gr. T. H. Slade).
2. Mr. R. M. Whiting.

Class 81.—Brownlee's Russet.

1. Mr. Geo. Chambers, Maidstone.
2. Roger Leigh, Esq.

Class 82.—Claygate Pearmain.

1. Mr. R. M. Whiting.
2. Roger Leigh, Esq.

Class 83.—Cockle's Pippin.

1. W. A. Sandford, Esq., Wellington (gr. S. Kidley).
2. E. J. Johnstone, Esq.

Class 84.—Court Pendu Plat.

1. C. Dresden, Esq.
2. Lord Braybrooke.

Class 85.—Cox's Orange Pippin.

1. J. Colman, Esq.
2. Roger Leigh, Esq.

Class 86.—D'Arcy Spice.

No awards.

Class 87.—Duke of Devonshire.

1. Marquis Camden.
2. Viscountess Portman, Uckfield (gr. H. C. Prinsep).

Class 88.—Egremont Russet.

1. O. E. A. d'Avigdor-Goldsmid, Esq.
2. Mr. R. M. Whiting.

Class 89.—Fearn's Pippin.

1. Mr. Stowers, Sittingbourne.
2. B. H. Hill, Esq.

Class 90.—Gascoyne's Scarlet.

1. Mr. Stowers.
2. Mr. F. W. Thomas, Polegate.

Class 91.—James Grieve.

1. Earl of Galloway.
2. Mr. T. B. Parfitt, Reading.

Class 92.—King of the Pippins.

1. Mr. Geo. Chambers.
2. Viscountess Portman.

Class 93.—King of Tompkins County.

1. Roger Leigh, Esq.
2. Col. Brymer.

Class 94.—Lord Hindlip. (Fig. 100.)

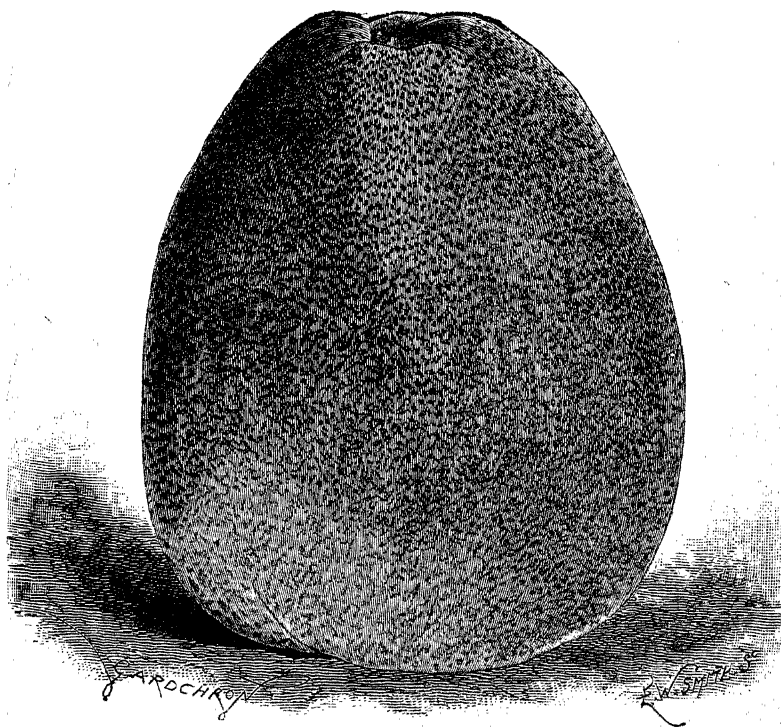
No awards.

Class 95.—Mannington's Pearmain.

1. Mrs. Nicol.
2. O. A. Smith, Esq., East Grinstead (gr. C. Harris).

Class 96.—Margil.

1. Roger Leigh, Esq.
2. Lord Poltimore.

FIG. 100.—APPLE, LORD HINDLIP. (*Gardeners' Chronicle.*)

Class 97.—Mother (American).

1. Roger Leigh, Esq.
2. E. J. Johnstone, Esq.

Class 98.—Ribston Pippin.

1. Lord Poltimore.
2. Mr. E. Chopping, Sittingbourne.

Class 99.—Scarlet Nonpareil.

1. Roger Leigh, Esq.
2. Leopold de Rothschild, Esq.

Class 100.—Sturmer Pippin.

1. J. K. D. W. Digby, Esq.
2. F. M. Lonergan, Esq.

Class 101.—Worcester Pearmain.

1. J. Colman, Esq.
2. Roger Leigh, Esq.

Class 102.—Any other variety.

An Exhibitor may only enter one variety in Class 102.

1. Roger Leigh, Esq.
2. J. W. Startup, Esq.

Cooking Apples.

Class 103.—Alfriston.

1. Roger Leigh, Esq.
2. Leopold de Rothschild, Esq.

Class 104.—Beauty of Kent.

1. Roger Leigh, Esq.
2. Lady Fortescue, Maidenhead (gr. C. Herrin).

Class 105.—Bismarck. (Fig. 101.)

1. Mr. S. W. Sweet, Ipswich.
2. Roger Leigh, Esq.

Class 106.—Bramley's Seedling.

First Prize, £1 ; Second, 10s. ; Third, 5s.

Prizes given by Messrs. H. Merryweather, The Nurseries,
Southwell.

1. Mr. Stowers.
2. Captain Carstairs, Newbury (gr. C. Ross).
3. H. St. Vincent Ames, Esq., Bristol (gr. W. H. Bannister).

Class 107.—Cellini.

1. Lord Poltimore.
2. Mr. R. M. Whiting, Hereford.

Class 108.—Cox's Pomona.

1. Roger Leigh, Esq.
2. Colonel Brymer.

Class 109.—Dumelow's Seedling (*syn.* Wellington and Normananton Wonder).

1. Mr. G. Chambers.
2. F. W. Buxton, Esq., Sawbridgeworth (gr. W. H. Godden).

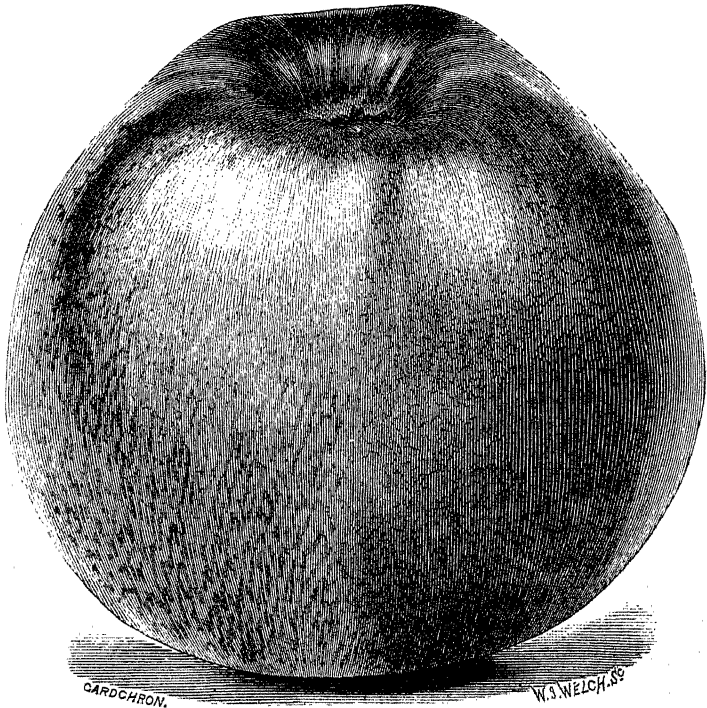


FIG. 101.—APPLE, BISMARCK. (*Gardeners' Chronicle.*)

Class 110.—Ecklinville Seedling.

1. Roger Leigh, Esq.
2. T. W. Startup, Esq.

Class 111.—Emperor Alexander.

1. Roger Leigh, Esq.
2. Mr. Stowers.

Class 112.—Frogmore Prolific.

1. Mrs. Nicol.
2. A. J. Howard, Esq.

Class 113.—Golden Noble.

1. Roger Leigh, Esq.
2. Viscountess Portman.

Class 114.—Golden Spire.

1. Roger Leigh, Esq.
2. Mr. R. M. Whiting.

Class 115.—Grenadier.

1. T. W. Startup, Esq.
2. Roger Leigh, Esq.

Class 116.—Hawthornden (New).

1. Roger Leigh, Esq.
2. J. C. Charlesworth, Esq.

Class 117.—Hormead Pearmain.

1. Roger Leigh, Esq.
2. Mr. R. M. Whiting.

Class 118.—Lane's Prince Albert.

1. Mr. E. Chopping.
2. Viscountess Portman.

Class 119.—Lord Derby.

1. Roger Leigh, Esq.
2. Rev. O. L. Powels, Weybridge (gr. A. Basile).

Class 120.—Lord Grosvenor.

1. Lady Fortescue.
2. Roger Leigh, Esq.

Class 121.—Lord Suffield.

1. J. K. D. W. Digby, Esq.
2. T. Oliverson, Esq., Maidstone (gr. W. Lewis).

Class 122.—Mère de Menage.

1. Roger Leigh, Esq.
2. Lord Poltimore.

Class 123.—New Northern Greening.

1. Captain Carstairs.
2. Mr. Geo. Chambers.

Class 124.—Newton Wonder.

First Prize, £1 ; Second, 10s. ; Third, 5s.

Prizes presented by Messrs. J. R. Pearson & Sons,
Chilwell, Notts.

Open only to Exhibitors living in Cardigan, Radnor, Shropshire, Stafford, Warwick, Northampton, Bedford, Cambridge, Essex, or Counties further north.

1. H. H. Hurnard, Esq.
2. Mrs. Wingfield.

Class 125.—Newton Wonder.

Open only to Exhibitors living south of the before-named
Counties.

1. Mr. F. W. Thomas.
2. Roger Leigh, Esq.

Class 126.—Peasgood's Nonesuch.

1. Roger Leigh, Esq.
2. T. Oliverson, Esq.

Class 127.—Potts' Seedling.

1. Roger Leigh, Esq.
2. Philip Crowley, Esq., Croydon.

Class 128.—Royal Jubilee.

1. Roger Leigh, Esq.
2. Captain Carstairs.

Class 129.—Sandringham.

1. Captain Carstairs.
2. Sir R. Sutton, Newbury (gr. J. Howard).

Class 130.—Spencer's Favourite.

1. Roger Leigh, Esq.
2. T. W. Startup, Esq.

Class 131.—Stirling Castle.

1. Captain Carstairs.
2. Mr. R. M. Whiting.

Class 132.—Stone's (*syn.* Loddington Seedling).

1. Captain Carstairs.
2. Duchess of Cleveland.

Class 133.—The Queen.

1. Roger Leigh, Esq.
2. T. W. Startup, Esq.

Class 134.—Tower of Glamis.

1. Roger Leigh, Esq.
2. Sir R. Sutton.

Class 135.—Tyler's Kernel.

1. Roger Leigh, Esq.
2. R. Salmon, Esq., Chester (gr. S. Lyon).

Class 136.—Warner's King.

1. Roger Leigh, Esq.
2. Mr. George Chambers.

Class 137.—Any other variety.

An Exhibitor may only enter one variety in Class 137.

1. Roger Leigh, Esq.
2. J. R. Brougham, Esq.

Dessert Pears.

Class 138.—Beurré Bosc.

No first.

Sir R. Sutton.

Class 139.—Beurré d'Anjou.

1. Marquis Camden.
2. Mr. J. Spottiswoode, Brighton.

Class 140.—Beurré Diel.

1. J. K. D. W. Digby, Esq.
2. Earl Percy.

Class 141.—Beurré Dumont.

1. Sir Mark Collet, Bart.
2. Rev. O. L. Powels.

Class 142.—Beurré Fouqueray.

1. Roger Leigh, Esq.
2. Leopold de Rothschild, Esq.

Class 143.—Beurré Hardy.

1. Roger Leigh Esq.
2. Viscountess Portman.

Class 144.—Beurré Superfin.

1. Roger Leigh, Esq.
2. A. B. Sheridan, Esq., Dorchester (gr. H. Harvey).

Class 145.—Comte du Lamy.

1. Lord Suffield.
2. J. T. Charlesworth, Esq.

Class 146.—Conference.

1. Roger Leigh, Esq.
2. Mr. F. W. Thomas.

Class 147.—Conseiller (or Maréchal) de Cour.

1. Colonel Brymer.
2. Captain Carstairs.

Class 148.—Doyenné du Comice.

1. Colonel Brymer.
2. Roger Leigh, Esq.

Class 149.—Duchesse de Bordeaux.

Class 150.—Durondeau.

1. Roger Leigh, Esq.
2. J. K. D. W. Digby, Esq.

Class 151.—Easter Beurré.

1. J. R. Brougham.
2. Colonel Brymer.

Class 152.—Émile d'Heyst.

1. Roger Leigh, Esq.
2. W. M. Cazalet, Esq., Tonbridge (gr. G. Fennell).

Class 153.—Fondante d'Automne.

1. Vicountess Portman.
2. Colonel Brymer.

Class 154.—Fondante de Thirriot.

1. Roger Leigh, Esq.
2. F. M. Rendell, Esq., Croydon (gr. W. Child).

Class 155.—Glou Morceau.

1. Roger Leigh, Esq.
2. Col. Brymer.

Class 156.—Joséphine de Malines.

1. Col. Brymer.
2. F. L. Davis, Esq., Caerleon (gr. J. Fraser).

Class 157.—Le Lectier.

1. J. R. Brougham.
2. Rev. O. L. Powels.

Class 158.—Louise Bonne of Jersey.

1. Duchess of Cleveland.
2. C. J. Lucas, Esq., Horsham (gr. G. Duncan).

Class 159.—Madame Treyve.

1. Roger Leigh, Esq.
2. G. H. Field, Esq., Sevenoaks (gr. R. Edwards).

Class 160.—Marie Benoist.

1. F. W. Buxton, Esq., Sawbridgeworth (gr. W. H. Godden).

Class 161.—Marie Louise.

1. Lord Suffield.
2. J. K. D. W. Digby, Esq.

Class 162.—Marie Louise d'Uccle.

1. Lord Suffield.
2. H. Padwick, Esq.

Class 163.—Marguerite Marillat.

1. Roger Leigh, Esq.
2. Mr. F. W. Thomas.

Class 164.—Nouvelle Fulvie.

1. Earl Percy.
2. Roger Leigh, Esq.

Class 165.—Olivier de Serres.

1. O. A. Smith, Esq.
2. Roger Leigh, Esq.

Class 166.—Pitmaston Duchess.

1. B. H. Hill, Esq.
2. F. M. Lonergan, Esq.

Class 167.—President Barabé.

No awards.

Class 168.—Seckle.

1. Viscountess Portman.
2. Capt. Carstairs.

Class 169.—Souvenir du Congrès.

1. Lady Fortescue.
2. Lieut.-Col. Sir C. Prevost, Bart., Dursley (gr. A. Coleman).

Class 170.—Thompson's.

1. Col. Brymer.
2. Lord Suffield.

Class 171.—Winter Nelis.

1. Mr. T. Bennett, Market Drayton.
2. Philip Crowley, Esq.

Class 172.—Any other variety.

An Exhibitor may only show one variety in Class 172.

1. Roger Leigh, Esq.
2. H. Partridge, Esq., Bletchingley (gr. R. Hardesty).

NON-COMPETITIVE GROUPS.

Awards made by the Council:—

Hogg Memorial Medal. (Fig. 95.)

To Messrs. T. Rivers & Son, for Apples, Pears, Plums, and Grapes.

To Messrs. J. Veitch & Sons, for Apples and Pears.

Silver Gilt Knightian Medal.

To Messrs. J. Cheal & Sons, for Apples and Pears.

Silver Knightian Medal.

To Messrs. J. Laing & Sons, for Apples and Pears in pots.

To Messrs. J. Peed & Sons, for Apples.

To Messrs. Sutton & Sons, for Tomatos.

Silver Banksian Medal.

To Mr. R. C. Notcutt, for Apples and Pears.

To Messrs. S. Spooner & Sons, for Apples and Pears.

To the Horticultural College, Swanley, for Bottled Fruits.

To the Dowager Lady Williams-Wynn, for Apples and Pears.

To Messrs. W. Cutbush & Son, for Apples.

To Lord Aldenham, for eighteen varieties of Ricinus.

Bronze Banksian Medal.

To Mr. W. Horne, for Fruit.

To Mr. W. Tayler, for Apples.

Very Highly Commended.

To Mr. J. Pinches, for Labels and Name-plates.

Amongst the interesting things shown, not for competition, probably the most interesting was the group of Castor-oil Plants in fruit, shown by Mr. Edmund Becket, gardener to Lord Aldenham, at Elstree. The following is a list of the varieties shown:—

1. *Ricinus communis minor*: leaves olive green, veined with pink; fruit seakale green, touched with yellow.
2. *R. corboriensis arboreus*: leaves metallic green, veined with red; fruit rosy pink.
3. *R. viridis*: leaves shining green; fruit very grass-green.
4. *R. atropurpureus*: leaves deep bronze-red; fruit very dark red with red veins.
5. *R. corboriensis*: leaves green, tinged with pink in the veins; fruit grass-green.
6. *R. sanguineus*: leaves metallic green with red veins; fruit glowing rosy red.
7. *R. sanguineus tricolor*: leaves dull green with red veins; fruit dark green, tinted with metallic red.
8. *R. Africanus*: leaves slightly glaucous; fruit blue seakale green.

9. *R. macrocarpus*: leaves very large, green; fruit very large, dark green, tipped with metallic red.

10. *R. Zanzibarensis*: leaves pale green; fruit very large, on long stalks; grass green. Very handsome.

11. *R. Belot Defourgeres*: leaves bright metallic red brown; fruit bright squashed strawberry red.

12. *R. Africanus albidus*: leaves pale green; fruit very glaucous.

13. *R. Cambodgensis*: leaves red metallic brown; fruit glaucous red brown.

14. *R. purpureus*: leaves very large, green, tinged and veined with red; fruit very large, green tinged with red metallic brown.

15. *R. glaucus*: leaves very pale green with white veins; fruit pale green, very glaucous, and hairy in appearance.

16. *R. Gibsoni mirabilis*: leaves very red brown; fruit almost scarlet.

17. *R. communis*: leaves very large, veined with red; fruit glaucous reddish green.

18. *R. Gibsoni*: leaves very bright red brown; fruit very dark red brown.

P. B. Burgoyne, Esq., of Poulett Lodge, Twickenham (gr. Mr. J. Hill), sent fruiting sprays of *Catalpa syringifolia* (or *bignonoides*). It is not often the *Catalpa* fruits so freely in this country: the fruits were like long thin curved French Beans, not unlike the shape of so-called Vanilla 'Beans,' but of a pale yellowish green, borne in clusters.

Messrs. James Veitch had a very large group of Bamboos in tubs and pots, and some lifted from the open ground. Amongst others were *Bambusa palmata*, a glorious big broad leaf of a bright dark green; *Arundinaria auricoma* (*Fortunei aurea*), a very pretty little golden-leaved plant; *Arundinaria variegata*, a charming silver-leaved variety; *Arundinaria nitida*, the very perfection of light and elegant growth.

Mr. John Russell, of Richmond, had a most charming group of Tree-ivies in pots. Besides tree-forms of all the more usual varieties, there were specimens of the following:—

Arborea Silver Queen: a lovely little pot plant, the foliage beautifully variegated with creamy white.

Arborea fructu-lutea: the leaves of a peculiarly shining green.

Arborea Gold Cloud : a very close-growing variety, with a profusion of small golden leaves.

Arborea albo-marginata : very pretty as a large plant.

Arborea aurea spectabilis, a very tall grower, with long leaves variegated with gold.

Palmata aurea : leaves very long, of a bright, clear yellow gold.

Arborea Russelliana, *Arborea conglomerata*, *Arborea minima* : three very curious plants, useful as introducing variety of foliage.

Arborea rhomboidea ovata : foliage of a very pretty green.

Arborea Rægnieriana : very dark handsome leaves.

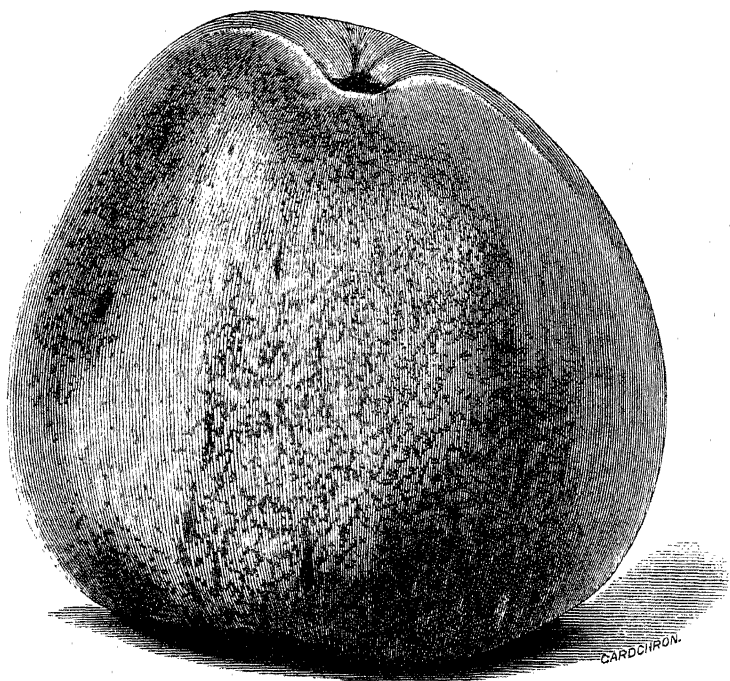


FIG. 102.—APPLE, CHELMSFORD WONDER. (*Gardeners' Chronicle*.)

There were one or two little items worthy of notice in the Show taken as a whole. For instance, the splendid condition

and beauty of the Plums, especially Mr. Rivers' seedlings 'Transparent,' 'Golden Transparent,' and 'Monarch': their character was maintained all through the Show. Never mind who showed them or where they had been grown, these three were always excellent, and often really wonderful. The new Plum 'Admiral,' said to be equal to 'Monarch,' but ten days later, was also very beautiful to look at, but this being its first appearance it requires the test of one or two seasons more. Mr. Colwill, of Sidmouth, had (for the time of year) some marvellous 'Northumberland Fillbasket' Raspberries and very good 'Coe's Golden Drop' Plums. Among Apples, Mr. Bunyard's 'Allington Pippin' was in very fine form, and on all sides those who had grown it were speaking well of it. 'Chelmsford Wonder' (fig. 102), as shown by Messrs. Veitch, was grand: it is said to have all the good qualities of 'Wellington' without its shortcomings in want of hardiness and liability to canker. 'Jubilee,' from Messrs. Cheal, is also fast coming to the front, and will probably be more heard of in future. The same was said in some quarters of 'Sandringham.' But it is a safe rule not to run after novelties too rapidly. 'Newton Wonder,' the great Midlands Apple sent out by Messrs. Pearson, of Chilwell, is no longer a novelty, but should be, and thoroughly deserves to be, universally grown as a January cooking Apple.

JUDGES AT THE FRUIT SHOW.

The following gentlemen kindly acted as judges, and deserve the best thanks of the Society for their really arduous labours, viz.—

Mr. J. Basham
 Mr. W. Bates
 Mr. H. Becker
 Mr. E. Beckett
 Mr. C. Blick
 Mr. W. E. Brooks
 Mr. W. Camp
 Mr. J. Cheal
 Mr. W. Crump, V.M.H.
 Mr. A. Dean
 Mr. W. H. Divers
 Mr. M. Gleeson
 Mr. C. Herrin
 Mr. J. Hollingworth
 Mr. Jas. Hudson, V.M.H.
 Mr. W. Jarman
 Mr. Peter Kay, V.M.H.
 Mr. W. King

Mr. H. Markham
 Mr. J. McIndoe, V.M.H.
 Mr. G. Miles
 Mr. G. Norman
 Mr. R. Parker
 Mr. A. H. Pearson
 Mr. W. Pope
 Mr. W. Poupart
 Mr. G. Reynolds
 Mr. H. Rides
 Mr. C. J. Salter
 Mr. J. Smith
 Mr. T. Turton
 Mr. H. E. Tillman
 Mr. J. Walker, V.M.H.
 Mr. A. Ward
 Mr. G. Woodward
 Mr. John Wright, V.M.H.

REFEREES AT THE FRUIT SHOW.

The following gentlemen very kindly held themselves ready at the disposal of the Society to act as referees if required, viz.—

Mr. H. Balderson
 Mr. A. F. Barron, V.M.H.
 Mr. G. Bunyard, V.M.H.
 Mr. Ph. Crowley

Mr. James Douglas
 Mr. Geo. Monro, V.M.H.
 Mr. T. F. Rivers, V.M.H.
 Mr. Geo. Wythes, V.M.H.

OBSERVATIONS ON SOME OF THE PLANTS
EXHIBITED.

OCTOBER 11, 1898.

By the Rev. Prof. GEO. HENSLOW, M.A., V.M.H.

DAHLIAS.—Mr. Henslow first called attention to the formation of the Cactus Dahlia, comparing it with a small-flowered variety, somewhat resembling that first introduced from Mexico in 1793. Double Dahlias soon afterwards became the fashion, in which the corollas of the *disk* florets became tubular, enlarged and coloured like those of the *ray*. In the 'Cactus' variety, they commence by being tubular; then, flattening the petals they finally become curved the reverse way, thus acquiring the characteristic type of flower.

LOBELIA CARDINALIS.—This was one of the earliest species introduced, viz. in 1629. Though it has no appearance of being a "composite" as the Dahlia, yet the structure of the essential organs so closely resembles that of the *Compositæ* that this genus may be regarded as probably approximating the ancestral form of that order.

PENTSTEMON.—The flowers of this plant appear to be following those of *Gloxinia* and other irregular flowers; in that, under cultivation, the corolla is tending to become regularly trumpet-shaped, and the stamens distributed around within it, instead of being located at one side, as in *Labiata*, *Scrophularineæ*, &c.

INSECTIVOROUS PLANTS.—These were illustrated by *Sarracenia purpurea*, *Cephalotus follicularis*, *Pinguicula cordata*, and a small species of *Nepenthes*, or Pitcher-plant. The special feature which the lecturer called attention to was the close similarities of structure; as especially seen in *Cephalotus* and *Nepenthes*, both of these having similar shaped pitchers, with rigid circular rims, and lids as well as glands sunk in the inner surface; yet they belong to orders widely asunder; so that these resemblances cannot therefore represent any points of affinity. The interpretation appears to be that similar circumstances have evolved similar structures; but what those conditions were are quite unknown. Another point showing the extraordinary

power of adaptation is, that while in *Nepenthes* the pitcher, according to Sir J. D. Hooker, is an outgrowth of a water-gland situated at the apex of the blade, in *Cephalotus* the pitcher is constructed out of the blade itself ; as it is also in *Sarracenia*.

HYBRID CRAB.—Attention was called to a new hybrid, raised by Mr. Veitch, between an ornamental Crab Apple called ‘Transcendent’ and ‘King of the Pippins.’ The latter Apple had greatly ameliorated the acidity and improved the appearance of the hybrid as well.

BEGONIA ‘Gloire de Lorraine’ is an interesting hybrid, one of its parents being *B. socotrana*, and the other *B. Dregei*. Its value resides, firstly, in its being very floriferous and late in the season ; and secondly, in bearing only male flowers for a considerable period ; but subsequently it produces female flowers ; so that as fertilisation cannot take place early, the flowers last much longer than they otherwise would.

PHYSALIS FRANCHETTI.—This plant is remarkable for its very large, brightly coloured, inflated calyx, and is a handsome decorative plant. Mr. Henslow referred to a description of another species in which the observer discovered a use of the bladder-like protection ; in that the whole articulated readily, and fell to the ground, when the wind rolled it to a distance, as it does the Rose of Jericho in the desert of N.E. Africa. And so the calyx aids in the dispersal of the plant.

INFERIOR FRUITS.—The lecturer took some large hips of Roses (*Rosa alpina* and *R. rugosa*) as illustrating a hollow “axial” receptacle, containing five achenes, or fruits, within it ; a Strawberry illustrating the converse condition, in that the achenes are outside a swollen receptacle. In a Pear, however, the internal carpels are reduced to five ; the *outer* epidermis of these and the *inner* epidermis of the axis being undeveloped, the central tissues of both become blended into a solid mass constituting the edible part. The upper part of the Pear, however, consists in addition of the fleshy stalks to the sepals. This was illustrated by drawings of monstrous and abnormal states of Pears, as well as by certain inferior fruits rooting in soil, since they were composed externally of an axial or stem structure. Such was the case with a Cucumber and a Prickly Pear.

FIGUS REPENS FRUITING.—A fig from this species was exhibited, and the lecturer called attention to the dimorphic

habit of the plant, in that as long as it is climbing a wall it has minute leaves closely adpressed to it; but when it is ready to flower it throws out branches with large leaves and bears the figs. Mr. Henslow alluded to a courtyard in Malta which is covered with *Ficus repens* bearing the large-leaved boughs, though the smaller-leaved stems also covered the walls.

FICUS SYCOMORUS.—While speaking of Figs, Mr. Henslow alluded to the custom of the fellahs of Egypt of cutting off the tops of the figs of this tree to render them edible, for the fruit is always infested with flies (*Blastophaga*). They use a piece of hoop-iron fixed into the end of a stick, one edge being sharp, or else a hooked piece of iron. Theophrastus, who wrote in the fourth century B.C., describes the latter instrument, and the use of it, though he thought it ripened the fig, making no allusion to the insects. The prophet Amos (vii. 14) described himself as a “cutter” of figs. The LXX. version translates the Hebrew by the same Greek word as that which Theophrastus uses; so that the occupation of the prophet was the same as is now practised in Egypt. He meant by it to signify that he belonged to the humblest class. Mr. Henslow exhibited three forms of “cutters,” and also figs cut by fellahs in Cairo, as well as others picked up in the public Esbikéeah Garden in Cairo, full of the *Blastophaga*. It is the same insect which is supposed to fertilise the figs in Malta and elsewhere, where the people hang up figs taken from the ‘Wild Fig,’ or *caprificus*, in the cultivated trees; but the operation appears to be really quite needless.

EXPERIMENTAL HORTICULTURE.

By Mr. GEO. GORDON, F.R.H.S., V.M.H.

[Read October 25, 1898.]

BRITISH horticulturists have in the past been so profoundly impressed with the importance of a practical acquaintance with the details of their art that they have almost overlooked the enormous value of a knowledge of the scientific aspects of gardening, and in consequence the utility of experimental work has failed to obtain proper recognition. The results of the views that have obtained are not difficult to appreciate, and I would

suggest that, while we have fully maintained the reputation this country deservedly enjoys for its magnificent gardens and the skill of its gardeners, the advance in many of the departments has not been so rapid as would have been the case had full advantage been taken of the opportunities we have had for the acquisition and dissemination of definite information on doubtful points of practice.

Let me not be understood as discounting the value of what is popularly known as "practical knowledge." So far from my doing this, I have consistently kept to the front the necessity of a practical acquaintance with the details of the art, when discussing the question of the training essential to success in garden management. But I differ from the general body of horticulturists in my interpretation of the term "practical" in its relation to the garden. While not a few regard it as essentially practical to learn by a process of imitation, I consider the most practical cultivator to be he who happily combines science with practice, and thereby places himself in a position to take the fullest possible advantage of the conditions that obtain where he pursues his avocations. Much misapprehension with regard to this matter has undoubtedly arisen in some quarters through confusing science with speculation; and to avoid labouring this point I will at once say that if we accept the definition that science is knowledge amassed, severely tested, coordinated, and systematised, as correct, we shall at once see that scientific inquiries, or in other words experimental work, should be warmly encouraged and widely extended.

There is, in fact, nothing more truly practical in the whole routine of the garden than the determination, by carefully conducted experiments, of the relative merits of varieties, the usefulness of the various fertilisers for the several crops, and the most efficient insecticides and fungicides.

It might, of course, be said that every garden is an experimental station wherein trials are continuously in progress, and this to some extent would be true. The lessons that have been obtained from the innumerable gardens in the United Kingdom have been of much value, as proved by the fact that horticulture has attained so high a position with but little assistance from properly equipped stations. But there can be no question that experimental horticulture should be placed on a more satisfactory

basis than individual effort, and be conducted on carefully planned and well-defined lines. It is not sufficient to record that a new varietal form of a certain vegetable thrives in one garden, and some other new introduction gives good crops elsewhere, unless we know something about the conditions under which they were each grown, and the points in which they differ from closely related forms in general cultivation when grown under precisely the same conditions. Experiments conducted otherwise than systematically must fail to be of any appreciable value, and they may be, as indeed many are, misleading. I mention this for the purpose of impressing upon those who have novelties submitted to them for trial and report, that it is not sufficient to subject the new introductions to a special course of culture while the standard varieties with which they are to be compared are grown under ordinary conditions.

Experimental horticulture has hitherto received but little attention from the innumerable societies that have been founded with the avowed object of contributing to the progress of horticulture, and of experimental stations strictly speaking there are but few. Foremost among these is unquestionably the Royal Horticultural Society's Garden at Chiswick, where, since its foundation, an immense amount of excellent work has been accomplished, as proved by the records in the Society's Journal. It would be difficult to place too high an estimate on the value of the information obtained in the course of the trials of fruits, flowers, and vegetables, that have been conducted at Chiswick during the long period the garden has formed part of the Society's possessions. But it is seldom that work, however satisfactory it may appear, is so well done that it might not have been better; and in the case of our garden we have not as yet taken full advantage of the opportunity it has afforded for determining authoritatively matters of pressing importance to the general body of horticulturists.

There is also the experimental fruit garden established by Earl Beauchamp at Madresfield Court for the purpose of subjecting to a thorough trial the more popular varieties of the several kinds of hardy fruits, with a view to assist the tenants on the estate in making selections for the formation of new orchards and plantations.

A still more extensive experimental fruit farm is that

established by the Duke of Bedford at Apsley Guise, where experiments of the most elaborate character are being carried out.

In addition to these, experimental plots and gardens have been established by several County Councils, and good work is being done at some of them ; but as yet they are too few and isolated to exercise a material influence upon the advancement of horticulture. I am, indeed, persuaded that they will not give an adequate return until they are brought into close touch with each other, and joining hands engage in experiments which, to be useful, must be conducted over a wide area, and consequently under divergent conditions of soil and climate. To bring the experimental plots belonging to County Councils into union, to formulate the experiments to be conducted on them, and to collate and prepare the results for publication, must of necessity be the work of some central body ; and I submit that it is work in which the Royal Horticultural Society might engage with advantage to itself and to the whole horticultural community. The Society would, I believe, be perfectly willing to undertake the work if the County Councils would only consent to be guided thereby.

When we turn to the Continent and the United States we find a different state of things, for in several of the Continental countries and in America, numerous experimental stations have been formed, and are maintained chiefly (often entirely) at the cost of the respective Governments. These stations are the most numerous in the United States, and it may be of interest to mention that by an Act passed by Congress in 1887 an annual sum of about £3,000 was appropriated to a separate department of each aided agricultural college, which the statute directs shall be called an Agricultural Experiment Station. But as the cultivation of fruits, flowers, and vegetables, for commercial purposes, is regarded in America as part of the farmer's business, these stations are as interesting to the horticulturist as to the agriculturist. As the result of this Act there are now fifty-four of these stations, with a staff of nearly 500 persons, of whom 115 are chemists, fifty-nine horticulturists, thirty-six entomologists, and thirty-six botanists. In many instances the annual grant from the Federal Government is augmented by grants from the State in which the station is

situate, and the total net annual income of all the experimental stations amounts to £678,000.

The Act under which these stations were established lays down on broad lines the experimental work that shall be undertaken ; but those responsible for their management have considerable freedom in formulating their plans. The Act stipulates that the object and duty of the stations shall be to make research and experiments on the physiology of plants and animals, their diseases, and the remedies for them ; the chemical composition of useful plants ; the comparative advantages of the rotation of crops ; the acclimatisation of new varieties of plants and trees ; analyses of soil and water ; and in the use of fertilisers.

Many points that have an important bearing upon the profitable utilisation of the land have already been determined by systematic experiments. In some instances there has been a tendency to superficiality of treatment ; but this is not surprising considering the unavoidable inexperience of some of those who were suddenly called upon to undertake duties which require trained scientific habits of both observation and expression. The condition imposed on each station of issuing four bulletins annually has probably been the cause of the publication of some few premature conclusions amongst the immense amount of interesting and useful information contained in the records of the stations. I might give many interesting details with regard to the experiments conducted at these stations ; but it must suffice to state that the directors have been especially active in dealing with insect infestations and fungoid diseases of plant life, and that we are indebted to them for much of the information at our command relating to the remedies for insect and fungoid attacks. It is a matter of common knowledge that ' London Purple ' and ' Paris Green,' two by-products of British manufactures, were brought largely into use in America for the destruction of caterpillars that feed upon the foliage of fruit trees, as the result of the investigations at these experimental stations, before the fruit growers in this country even knew of the existence of these two powerful remedies. On learning from the bulletins that Paris Green and London Purple were being used in America for the protection of fruit trees from the ravages of the caterpillars of the Winter and other moths, inquiries were made, and it was then discovered that American cultivators

had obtained the whole of their supplies of these preparations from England. This fact, if not of itself a sufficient justification for the formation of experimental stations, is an ample proof of the necessity of greater activity in research and experiment, both by societies and by individuals in this country.

It might seem reasonable to suggest that we should look to the horticultural societies that are distributed in such large numbers all over the United Kingdom for information on matters that can only be satisfactorily determined by actual experiment. But reasonable as the suggestion would be, I must point out, and I do so reluctantly, that were we to look to them for help we should do so in vain. Those responsible for the government of horticultural societies take, with but few exceptions, a very narrow view of the means by which they may attain the object for which they avowedly exist; and as the result of these contracted ideas there is annually an enormous waste of force and money. The Royal Horticultural Society stands alone in its encouragement of investigation; and if its efforts have at times fallen considerably short of its opportunities it has in its vindication of research and experiment rendered services of immense value in the advancement of the higher branches of horticulture. There can hardly be any doubt that the experimental work of the Society has in the past been somewhat hindered by the necessity which was assumed to exist for giving the Fellows some outward sign of activity by concentrating both effort and money on the exhibition side of the Society's work. It is gratifying to have evidence that wiser views now obtain in our governing body, for the lessons to be derived from the history of horticultural societies during the past half-century teach us that the carrying out of exhibitions on ordinary lines is not of itself sufficient to justify the existence of a society of the front rank. I could in proof of this point to once flourishing societies which failed to give their Fellows and members anything beyond admission to exhibitions, and which have, I believe, as a consequence, become things of the past, or are in such a moribund state as to be incapable of rendering service to either the science or the art of gardening. But for my present purpose it is sufficient to emphasize the fact that the Royal Horticultural Society has itself certainly been most flourishing during those periods in which it has devoted a full share of its

energies to the scientific investigation of problems of general horticultural interest. For the Society's own sake, therefore, I hope that this important branch of its work may be still further extended in the near future.

Before, however, the Society's experimental work can be fully developed the facilities for carrying it out must be greatly increased. One of the principal requirements at the present time appears to be the acquirement of a spacious garden, away in the country, as supplementary to, or in process of time in the place of, the existing garden at Chiswick. Without attempting to discuss details I would say that a garden is required that will be beyond the influence of the London smoke and fogs, and so designed as to enable the various experiments to be conducted without difficulty. It should contain glass houses of modern design, and suited for purposes of experiment. The new garden should comprise some twenty or thirty acres of land of average texture, and well suited for the growth of fruits and vegetables, and yet be within a convenient distance of London. It is of the utmost importance that we should have, in the United Kingdom, Collections of hardy fruits and Grapes, but these should consist exclusively of varieties that have been proved by actual trial to be worthy of cultivation. Complete collections might be considered of more interest, but I regard the cultivation of varieties known to be worthless, or even inferior, as a waste of time and space. It is hardly necessary to say that the best place for these type collections of proved varieties would be the Garden of the Royal Horticultural Society. They would be of greatly enhanced value if each of the varieties of Apples and Pears were trained as cordons, bushes, and pyramids, and the other fruits in the several various forms in which they are known to give good results. There should be still further duplication by the use of both free and dwarfing stocks, and arranged in this manner the collections would afford object lessons of immense value. They might be made still more valuable by a careful record of the quantity of fruit the several varieties produced in proportion to the space occupied in a given number of years. We know in a rough-and-ready way that certain varieties of Apples, Pears, Peaches, and Plums, &c. are more productive than others; but it would be of scientific and practical interest to have in a readily accessible form exact information as to the average

weight of fruit produced by the different varieties under ordinary good cultivation. Such loose statements as "good croppers," "moderate croppers," and "poor croppers" no longer suffice, and should be carefully avoided in future by all experimentalists.

Information equally valuable would be obtained from the cultivation of type collections of vegetables, as they would serve the purpose of object lessons and as standards of comparison with new forms.

The scope for scientific investigations in horticulture far exceeds that which is generally considered necessary, and there are questions awaiting solution that would fully occupy the staff of a properly equipped station for, say, ten years. We are in great need of more exact information on the use of artificial and natural manures in the cultivation of the various fruit and vegetable crops on the different soils, and until this is forthcoming there must continue to be much waste. Not less necessary is it that the various remedies for insect pests should be fully investigated under a diversity of conditions; and in view of the importance of the Onion crop as a commercial product it is desirable that it should be determined by systematic experiment whether the Onion-fly, whose grubs do damage to the extent of some thousands of pounds sterling annually, can be checkmated by autumn and winter sowings. If this question be decided in the affirmative it will be necessary to ascertain on what soils the change in the time of sowing can be successfully made, and the difference in point of time that the produce of autumn, winter, and spring sowings can be had in usable conditions. Then if we turn to the diseases of other crops it will be generally acknowledged that it is time a serious attempt be made to grapple with that terrible scourge popularly known as club-root, and other evils which involve heavy losses annually.

These and some other experiments to be thoroughly successful must be conducted on definite lines by a central body in widely different districts, and consequently under varying conditions of soil and climate. It is for this reason that I strongly advise co-operation amongst experimentalists, or where that is not practicable of arranging for experiments to be made under proper supervision in different districts. When trials of manure are made

care should be taken to select land of uniform quality, for when, as sometimes happens, the experiments are conducted on lands that were cropped and manured in several different ways in the previous year, the results are, if not actually misleading, of no practical value. It should be obvious that the results obtained from land that differs in its area as much as does that of a group of allotments cannot give trustworthy information, but the fact is sometimes overlooked and some reference to the point becomes necessary.

Well worthy of consideration is the question whether something might not be done to improve some existing races of plants. For example, experiments made with a view to ascertain whether *Asparagus* plantations might not be rendered more productive and profitable than they now are, and whether the Blackberry could not be so improved as to be cultivated with profit, would be of much interest, and they might prove of far-reaching importance to cultivators of land.

At the present time *Asparagus* beds, both in private and market gardens, are formed without any reference to the seed-bearing propensities of the plants employed. *Asparagus* plants differ materially in seed production, and if we examine a plantation formed in accordance with orthodox practice it will be found that some of the plants are barren, while others have light or heavy crops of seed. It will also be observed that the vigour of the plants is in inverse ratio to the crop of seed they are bearing. The barren plants will on examination be found to be producing a forest of stout growths rising to a height of 5 ft. or 6 ft.; those producing light crops of berries will have growths of more moderate stature; while those heavily seeded will be making such a weakly growth as to indicate clearly a prospect of only very spindly heads in the following season. I am impressed with the conviction that were we to grow the plants a second year before using them in the formation of beds, and in the interval eliminate all that show signs of seed-bearing, we should in a few years obtain *Asparagus* so improved as to come into line with the finest of the produce from France. This is a question that can only be conclusively solved by carefully conducted experiments; and I hope that at no distant date the matter will be fully investigated.

Not less important is it that an endeavour should be made

to improve the Blackberry—whether by selection or intercrossing with the large fruited varieties, such as *Rubus laciniatus*, I leave to the experimentalists. We know that it will thrive on land not well suited for other crops, and that a good market has already been obtained for its fruit.

To improve the records of experimental horticulture is even more important than an extension of the work; for unless these are full and exact the experiments are shorn of much of their usefulness. When we read the records of a trial of vegetables we are naturally desirous of knowing, with some degree of exactitude, the chief points of difference between the varieties forming the trial; and this is usually a matter of difficulty, whether the report be a record of the trials at Chiswick or elsewhere. If we turn, for example, to the particulars of a new variety of Potato grown in a trial, we shall learn something about its habit; whether it belongs to the early, mid-season, or late section; also whether it is a light, medium, or heavy cropper; whether it has tall haulm or short. But such general statements are of no great service to anyone, and should no longer have a place in a record of scientific investigations. Still taking the Potato as an example, we should in the case of a new variety have information as to the date of planting, the length of row, the number of sets in a row, the date on which the tubers were fit to lift, when the crop was ripe for lifting, and the weight of crop obtained from a given length of row, accompanied by the same particulars of the standard variety grown alongside for comparison. In trials of well-known varieties these particulars should also, of course, be given. And what is said with regard to Potatoes will apply *mutatis mutandis* to everything else. In the case of fruits full information should be given as to the weight or number of fruits produced in a given area, the exact time during which the produce is available; and the best varieties in the several periods of the season should be clearly indicated. In the current issue of the Society's Journal, for example, there are reports on the collections of Peaches and Raspberries, and embodied in them is much valuable information; but the reports are less valuable than they would have been had the varieties been grouped according to their respective seasons, and carefully prepared selections given, to show at a glance the best varieties for maintaining a successional supply, and thus furnished exactly

what is wanted in turning for information to reports of experiments.

To deal with a question of this importance exhaustively is out of the question, but I hope I have said sufficient to indicate that the experimental side of horticulture should receive increased attention, and that greater advantage would result, even under existing conditions, were the experiments made in various parts of the country recorded with due regard to scientific exactitude.

OBSERVATIONS ON SOME OF THE PLANTS EXHIBITED.

NOVEMBER 8, 1898.

By the Rev. Prof. GEO. HENSLow, M.A., V.M.H., &c.

NERINE HYBRIDS.—An interesting collection was exhibited by Mr. Elwes, of which *N. pudica* × *N. sarniensis* was shown with the parents. Of the latter were several varieties. These were apparently the result of spontaneous variation among seedlings. The hybrid is called 'O'Brieni.' Another was the result of crossing *N. flexuosa* (white) with *N. Fothergilli* (orange), and also with *N. sarniensis*. The latter showed the not uncommon result of mixing *white* with *orange*, in that one of the two colours in combination disappears, the hybrid shown being pink.

These latter hybrids are desirable because the foliage is fully developed simultaneously with the flowers (fig. 103); whereas in the former crosses it is more or less undeveloped. The usual period of flowering is in September; but an object Mr. Elwes had in view, and succeeded in obtaining, was to secure a race flowering later, so as to be associated with the Chrysanthemum.

Mr. Henslow called attention to a feature of *N. pudica*, in that the two lowermost perianth leaves spread out, destroying the regularity or symmetry of the flower. This feature is observable in many flowers which have their stamens declinate, as in *Epilobium*, *Dictamnus*, *Clerodendron*, &c.; and the inference is, that as the stamens form the landing place for the insect, this disturbance of the perianth is a result of the intrusion of the insect visitor, and it has ultimately become a fixed feature. As

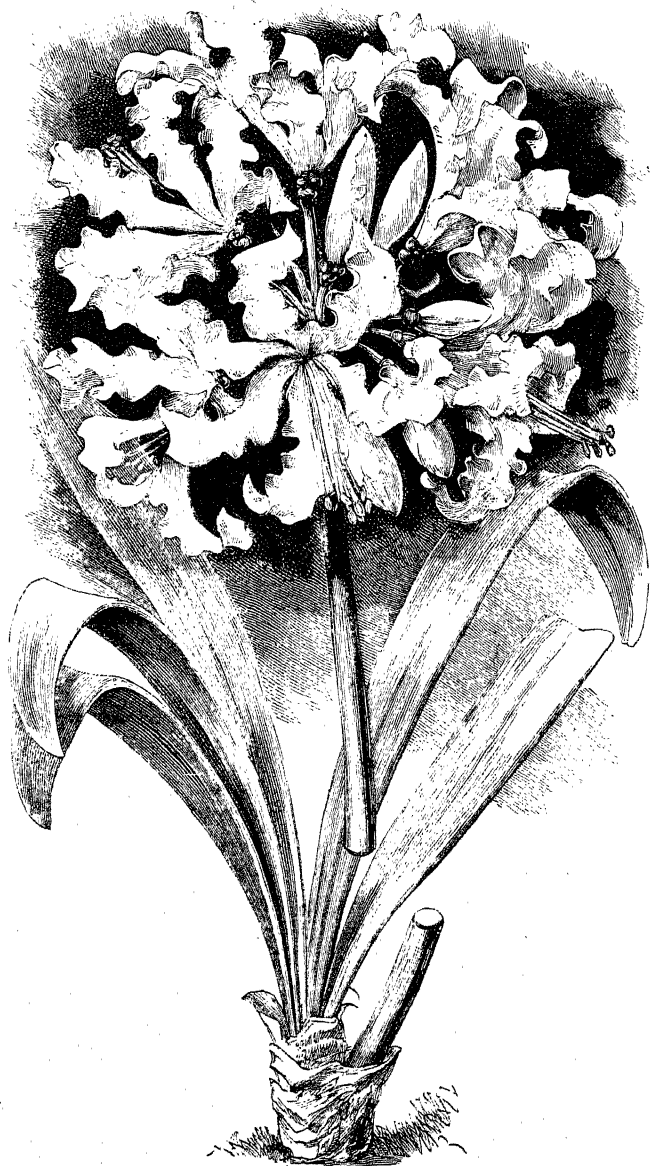


FIG. 103.—WHITE NERINE. (*Journal of Horticulture.*)

the other species has regular flowers, it will probably disappear in the cross produce.

POLYPODIUM, sp.—A great variety of Ferns were exhibited by Mr. Ware, and the peculiarity in the genus referred to is the similarity of several species to the fronds of other genera. Thus one resembles a hart's-tongue, another an *Asplenium*, a third has narrow grass-like leaves; the interpretation being that, probably growing under similar conditions, they have developed similar fronds, though they retain the characteristic features of the reproductive elements which mark the genus. Mr. Henslow also called attention to another adaptation in that some had creeping aerial stems adherent to the surface of the flower-pots precisely like aerial Orchid-roots.

HYBRID POLYPODIUM.—A supposed cross between our English species and a foreign one was shown; but, as the lecturer explained, in consequence of the impossibility of strictly crossing them artificially, it could not be proved that the result was a true hybrid. It had not much of *P. vulgare* in its appearance.

CYPHOMANDRA BETACEA.—This plant was introduced from South Brazil in 1836, and is miscalled the Tree Tomato. The oval orange-coloured egg-shaped fruits are edible. Mr. Henslow alluded to a popular conception that *all* purple fruits of the Solanæ are poisonous, but that *all* yellow, scarlet, or orange fruits are edible. Though a good rule for public use, it is not absolutely true, as the purple berries of *Solanum nigrum* and the Aubergine, the fruit of *Solanum Melongena* of the market, are exceptions. The purple-black berries of the Deadly Nightshade are, however, extremely dangerous.

PEARS WITH OBLIQUE ENDS.—Mr. Henslow explained the origin of the peculiar hump often present at the stalk end of Pears. It is due to the fact of the stalk extending obliquely from the tree, the Pear itself hangs vertically, so that the tension of support and the weight are two forces acting at an angle at the base of the Pear. To meet the resultant of these forces and prevent rupture, the Pear puts on additional tissues, causing the hump to arise on the further side of the stalk. This is only one instance out of many adaptations to mechanical strains and tensions to which plants are often subjected; but in every case the plant meets the strain by putting a woody, fibrous, or other tissue requisite for the occasion.

A VISIT TO NAINI TAL, KUMAON, INDIA,
THE SUMMER RESIDENCE OF THE LIEUT.-GOVERNOR OF THE
NORTH-WEST PROVINCES.

By Mr. C. MARIES, V.M.H.

Naini Tal, Sept. 25th, 1897.

This is not the best time to visit this beautiful hill station. Everything is still fresh and green on the lower hills, and from Katgodam Station, the terminus of the Rohilkund and Kumaon Railway, one passes on the road forests of Sal (*Shorea robusta*), first mixed with all kinds of Indian trees and shrubs, the giant-creeper *Bauhinia Vahlii* monopolising many trees, big *Pothos* covering whole rocks in the rushing mountain torrent bed, the banks on the road-sides being a perfect mass of Bamboo Grass (*Arundinaria*), *Selaginellas*, *Adiantum Capillus-Veneris*, *Pteris longifolia*, *Cheilanthes farinosa*, and other ferns; and by the lesser streams are masses of *Alocasias* and *Caladiums*, some with fine black blotched leaves. There are no tree-ferns here, but there are many noble fronded ones, which look grand in their native home. There are also many pretty *Begonias*, dwarf, bulbous hairy-leaved ones bearing solitary seeds. Numerous *Balsams*, yellow and pink, are everywhere on the banks. Then, at about 2,500 feet, come the forests of *Pinus longifolia* (see fig. 104 for a specimen in spring, before the long leaves are developed), splendid trees many of them; and here one misses the "Sal," Mango, and Jhamun trees, their places being taken by a Maple, an evergreen species with lanceolate leaves; also by Oaks, *Dalbergias*, *Acacias*, Wild Pear, Cherry, and Brambles, here called Raspberries, that produce enormous quantities of red or yellowish fruit. Here also is a garden, close by the road in the valley, called Douglas Dale. Strawberries, Mulberries, and all the Orange tribe grow to perfection, and one of the finest *Bougainvilleas* I have ever seen grows over the porch of the house. Near by are fine Walnuts. It is a strange sight for one lately arrived from England to see plants like *Cœlogyne cristata*, *Saccolabiums*, and *Aërides*, growing in the open air with Walnut trees, Weeping Willows, and Oranges.

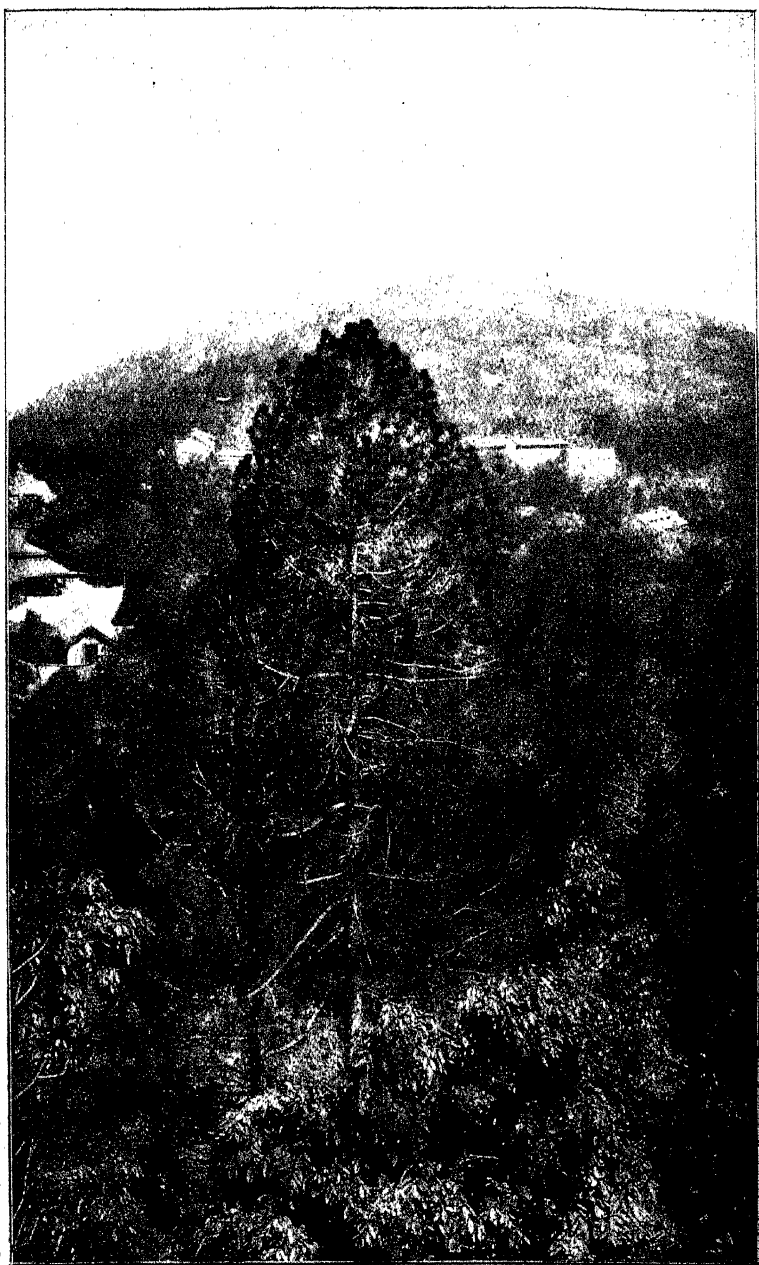


FIG. 104.—*PINUS LONGIFOLIA* IN EARLY SPRING.

It was not far from here that I found one of the finest *Habernaria* I have ever seen, and I at first thought it to be a new *Disa*. It grows 2 to 3 feet high, having bold, broad foliage, with three or four flowers on a spike: the flowers are 3 to 3½ inches across, creamy white to pure white petals on some varieties, wide, and of a fine incurved shape, the two side petals being beautifully pectinated; at first sight it is just like a *Disa*; it is not very common. Here near the rocks and little streams that trickle over the road are hundreds of magnificent butterflies, the curious leaf butterfly *Machis*, *Papilio Paris*, *Apillyon*, and many others abound; on some wet spots hundreds of small yellow butterflies hover round. Here, too, is the home of the "Lungoor," or the "Hunamon," of the Hindoos, a very handsome black-faced monkey. I will digress and give you a tale. The natives say that "when the god Hunamon went to Ceylon to rescue the wife of Ram Chunder (the beautiful Sita), he was caught by the fiends there and enclosed in a net, a very sacred one that could not be burnt. (Of course Hunamon could not burn, being a god.) However, Hunamon contrived to get some Brahmin threads, more sacred still, and tied them to his tail (all Brahmins wear this sacred thread round their bodies) and set fire to them. The sacred fire ignited the net and Hunamon escaped, but he could not put out the burning tail; and as he crossed the 'Devil's Bridge' (the ridge of rocks that connect Ceylon with India) he thought the sea would put out the fire; but it would not, so Hunamon bit off the end of his tail and singed his face; hence his face has ever since been black." Perhaps the naturalist can explain if he is a joint or two short. I am afraid this tale has rather put off the trip to Naini Tal. So we will leave Hunamon and his large family on the rocks above the beautiful Douglas Dale.

Just above here the Roman Catholic priests have established gardens. I believe they have taken up a lot of land for poor destitute Christian people and their families, and I hear they have had many additions to their numbers during the last famine. The soil will grow almost anything in a lovely climate about 4,000 feet elevation. The cart-road from Katgodam Railway Station ends at a place called "Beer Buti," or the Brewery. Here a fine brewery has been started on a very extensive scale, and I must say the beer is excellent. From the brewery one ascends a zigzag path about 2,000 feet through forest, and the



FIG. 105.—OAK TREE COVERED WITH *DAVALLIA TENUIFOLIA*.

vegetation changes from the semi-tropical to an entirely temperate one. *Aspidiums* and *Lastreas* are the common Ferns; *Polypodiums* and *Davallias* cover the branches of the trees. I enclose a photo of *Davallia tenuifolia* growing on a tree by the roadside. The tree is an evergreen Oak (fig. 105). A tremendous rushing torrent accompanies the road most of the way, and the recent rains have so swollen this stream that the road in many places is washed away. The hillsides are covered with Maples (evergreen), Oaks, *Albizzias*, and *Pinus longifolia* (fig. 104), and as one ascends, pretty villas, surrounded with orchards of Pears, Apples, Peaches, Oranges, Plums, &c., on terraces, meet the eye; and as one nears Naini Tal the forest disappears, and a bazaar is entered—not a particularly clean one—at the lake end. Here, as one ascends the open road at the end of the lake, is one of the finest views in India (fig. 106).

The lake is over a mile long, and is one of the most beautiful in India. The west side is almost a sheer precipice, covered with evergreen Oaks, Maples, Ash, Poplar, Cornus, Holly, and dwarf Bambôos as an underscrub, with *Rhododendron arbo-reum* on higher elevations. A road is made for foot traffic on this steep side by the lake, and for a botanist it is a most enjoyable walk. I was particularly struck with a fine herbaceous *Spiræa*, like an enormous *Spiræa astilboides*. There are also *Loniceras*, *Deutzias*, *Cratægus*, and *Viburnums*, reminding me very much of the hills in Japan. Ivy and *Ampelopsis* (very much like the old Virginia Creeper) cling to the trees. On the tremendous sheer rocks can be seen large-leaved *Saxifrages* and *Begonias*, with *Anemones* and innumerable *Mesembryanthemums*. Ferns, too, I think nearly all our English species, in enormous quantities. Here, too, is the home of *Pteris cretica* and *Pteris biaurita*. The beautiful dwarf Bamboo in one place growing amongst big boulders, covered with *Athyrium Filix-fœmina*, and Moss is a sight seldom seen. There is one of the finest silkworm moths found here; a beautiful blue magpie feeds on the chrysalis, taking the cocoons from the topmost branches of the Oaks, bringing them down to a ragged spur on the tree, and tearing the silk cocoon to pieces. They are evidently very fond of the chrysalis, as I saw hundreds of the old cocoons torn to pieces. The Atlas also, a lovely light green silkworm moth, I caught here, with enormous twisted tails to the underwings,



FIG. 106.—CHIBENA MOUNTAIN AND NAINI TAL LAKE, KUMAON.

and a large moon-shaped mark on the upper wings : it measured six inches across.

The east side of the lake is the main approach to the town, and the residents live at all levels on the mountain side, wherever a level or a suitable site can be made to build a house on. Most of the trees have been cut, a few old evergreen oaks only remaining, and some recently planted poplars and weeping willows by the lake side. All the available ground has been taken up for building purposes.

In fig. 106 you will see in the far distance the big mountain "Cheena." This is about 8,600 feet high, and is almost the only place where *Cupressus torulosa* is found wild, and it may be seen covering the slope in the distance. It is very like some of the Japanese *Retinosporas* in habit, a very handsome tree, and often grows 150 feet high, and many I have measured four feet from the ground are 15 feet in circumference. These trees on this mountain are, I believe, preserved now by the Municipality of Naini Tal.

Fig. 107 is *Cupressus torulosa* in the graveyard at the foot of Cheena. These are wild trees, not planted, and once formed part of the forest.

On the northern slopes of Cheena large plots of Deodar have been planted. I also noticed some *Picea Smithiana*, all doing very well, but I think not planted thickly enough. I imagine where such a dense growth of undershrubs and grass grow up, as it does here on Cheena, where the original forest is cut, the thick planting is the proper thing to do, because after a few years the trees will be so close together there will be no chance for coarse jungle to grow, and, as I remember in the Yeso forests, the strong trees always outgrow the weak, and save the trouble of thinning and cleaning. I wonder *Cryptomeria* and some of the other strong growing *Coniferæ* are not planted in the valleys. *Cryptomeria*, *Wellingtonia*, *Thuyas*, and *Retinosporas* being only ravine and valley trees, they are seldom seen on high mountain slopes in their own country, and generally grow in débris and loose soil, whereas the *Abies* and *Pinus* are often found wild in the strongest loams and on exposed mountain spurs.

Most of the original Oak forest has been cut for firewood for use in Naini Tal. I think this a great shame. The bark of



FIG. 107.—CUPRESSUS TORULOSA IN THE CEMETERY AT NAINI TAL.

these Oaks I suppose is useful for tanning. What a pity, then, that all is wasted! One firm at Cawnpore uses over 100,000 maunds of bark a year, or about 3,700 tons. Surely if the bark was of any use it could have been ground and compressed at Naini Tal, and supplied to Cawnpore at a less rate than the present article used for tanning, the "Babool," or *Acacia arabica*. There are many things here that might be turned to account.

Apricots and Plums are simply *wild* all over Naini Tal. The former is small and of poor flavour, but makes excellent jam. The Plum is often nice to eat, but not large, nor of sufficiently good quality to introduce into England: it looks like a very large Bullace, but is sweet and pulpy. I hear a firm of confectioners in Calcutta have already turned both these fruits to good account, and are making fine "pulp" (I don't mean the rubbish exported from France, but good, honest, sour jam), to be worked up in their Calcutta factory. There are many fruit farms established round here. The Government have a large nursery near, whence thousands of "grafted" trees are sent out every year of very indifferent varieties. They issue a catalogue of some 150 varieties. It would save them a lot of trouble, and the buyers much bad language, if the Forest Department would select about ten really *fine* Apples, and the same number of Pears and Peaches, and propagate these, true to name, and supply these only to the people who intend planting them.

Cheena Mountain, the home of *Cupressus torulosa* (see fig. 108) is a most interesting place for the botanist, and I cannot attempt to give the names of all the beautiful herbaceous plants I saw there to-day (September 28). This is not the time of year to see it in its glory; but a few names may be of use to some perhaps.

LIST OF PLANTS ON CHEENA.

Aquilegias, *Primula denticulata*, a Bracken very much like our English one, *Desmodiums*, two Lilies, one with large white flowers, much like *Wallichianum*, another pink with recurved segments. These will soon be exterminated, as they are pulled up, roots and all, to decorate the rooms of Europeans. A fine blue Thistle, white and blue Asters, of several kinds—one is very pretty when hanging in masses from the rocks—*Centaureas* with white leaves and large yellow flowers, *Thalictrums*, Sage-like plants in great variety, Wild Thyme, a purple *Geranium* like

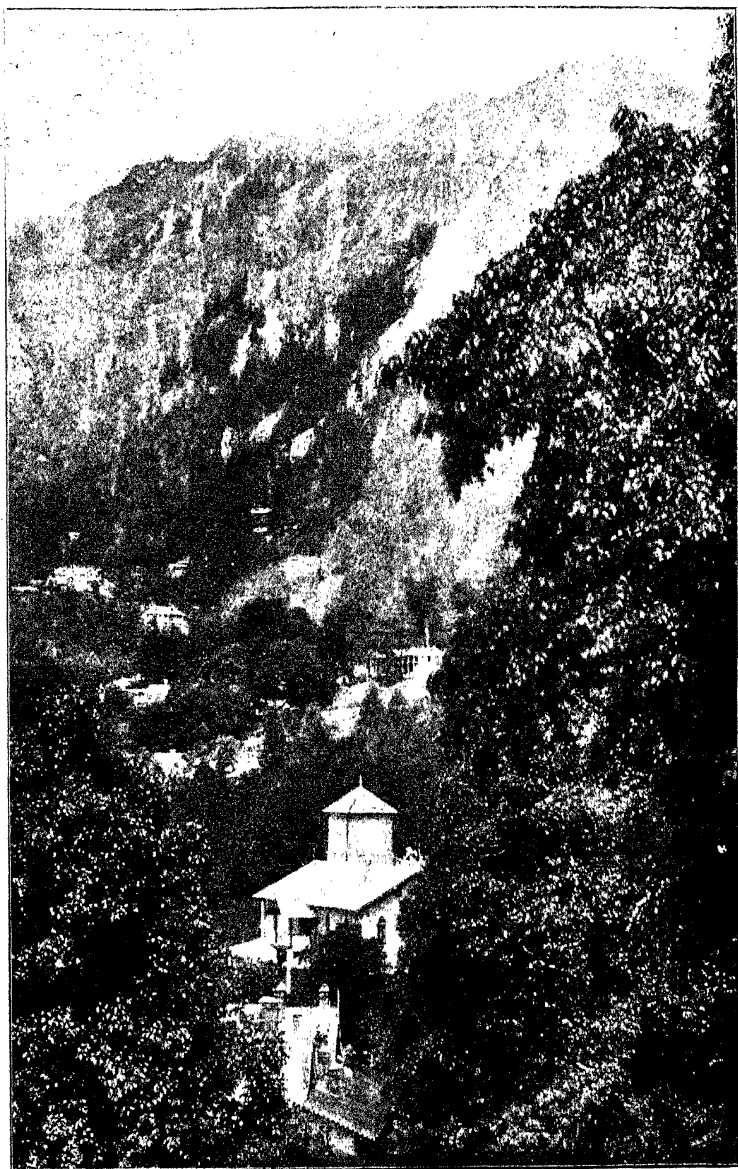


FIG. 103.—CHEENA MOUNTAIN.

our English *G. pratense*, *Hypericum* (two species), a yellow Clematis, with bell-shaped flowers, very pretty. One of the handsomest trees on the lower hills of Cheena is a large vine-leaf-shaped Maple. The treeless slopes are a mass of blue Thistles, Verbascums, white Everlastings, Ragwort, and other flowering herbaceous plants. The rocks are covered with masses of a fine small-leaved Cotoneaster, and in sheltered places, Cheilanthes, in two varieties, and a pretty Selaginella grow. The large and exposed cliffs are generally covered with large-leaved Saxifrages, Ampelopsis, and a lovely blue Composite, like a blue Dandelion. The shaded gorges below Cheena, on the north, are filled with a magnificent Oak (ever-green) forest, and Ferns are very abundant. The tree trunks are covered with a mass of *Polypodium appendiculatum*, and the shaded banks with a very pretty Adiantum, much like *A. Monochlamys* of Japan. We found also a beautiful Anœctochilus growing in the moss in one place; also a Cornus, a bush with lovely corymbs of scarlet berries, quite a feature in the jungle. On the tops of the ridges are masses of Spiræa, a shrubby species, with Deutzias and Berberids. I noticed the Forest Department had planted Walnuts largely in one place, and they seem to do very well. Primula denticulata is very abundant, and a fine scarlet-flowered Polygonum. Under the dense shade of the forest the banks are covered with a fine-leaved Ophiopogon. A great feature now on Cheena are the masses of white Everlastings, three or four varieties: one sees them for miles on the green slopes. This is the home of the bhurul (wild sheep), sarou (goat antelope), kharker (barking deer), jarou (large deer, or sambur); there are also plenty of panthers, fresh marks of which we constantly came across in our rambles. The College and Cheer pheasant abound here; also wood-partridges.

Naini Tal can be sometimes a very wet place. It commenced to rain at 10 P.M. last night, and came down in torrents. I have been in my room ever since. To-day the rain has not abated one jot, and is now coming down so hard that one cannot discern an object 100 yards off. The total rainfall for June, July, August, to September 16 this season is 166.63 inches; rather a good amount for three months and a half—more than England receives in three years I daresay. Yet people think they can grow fine Apples and Pears in such a downpour! The

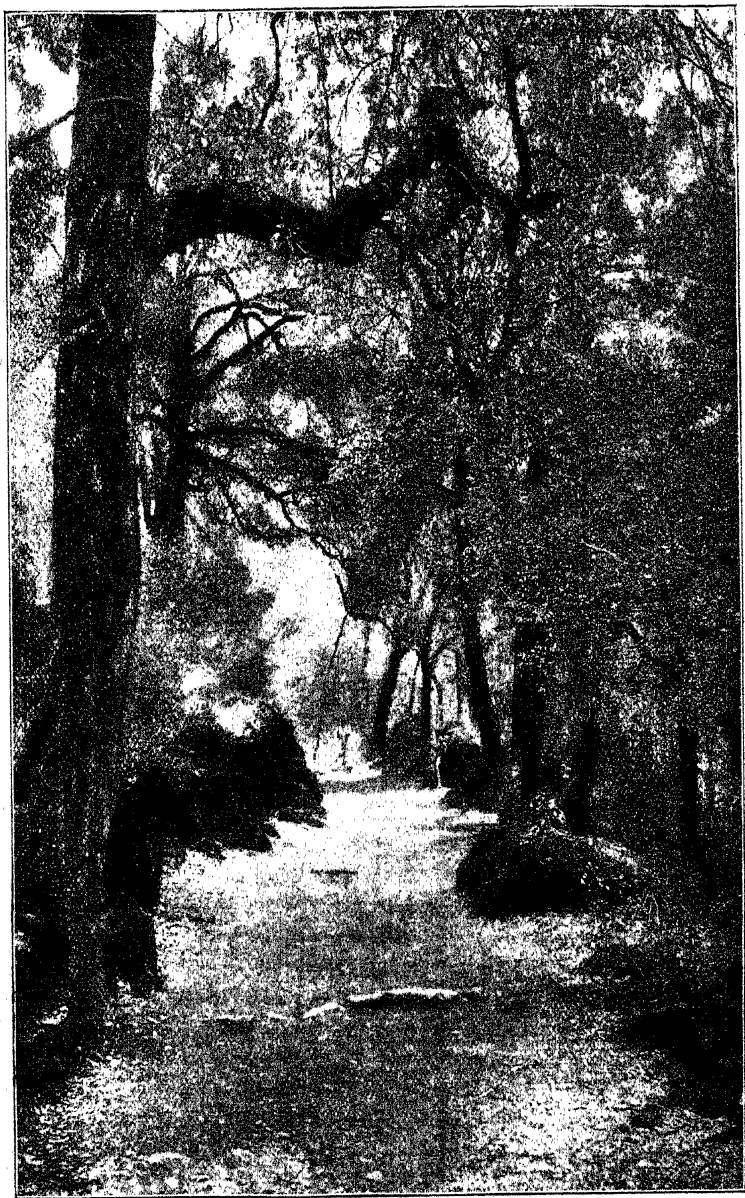


FIG. 109.—FOREST ROAD, NAINI TAL.

total for 1896 for the same months was about 70 inches; for 1895, about 81 inches. In October 1894, on October 5 and 6, it was 13 inches; on October 17, 1893, $12\frac{1}{2}$ inches. This year it may break the record: it did indeed, as it rained 18 inches in eighteen hours, 12 inches of which fell in six hours, on September 26 and 27; on July 13 it registered 5 inches, and the following day 13, in the two days nearly 18 inches. Fancy half the yearly rainfall of England in two days! The winters, too, are sometimes very severe; as much as 6 feet of snow sometimes. Last year there was over a foot about Christmas. Then the weather is delightful, the air sharp and bracing. That is really the time for "Britishers" to enjoy this magnificent hill station.

On the east of Naini Tal Lake is a hill about 1,000 feet high, on which many of the houses of Europeans are built. From the top of this hill is a place called Snow Seat, surrounded with Rhododendrons, Lespedezas, beautiful Grasses and Dahlias. In front, as you rest on Snow Seat, is one of the grandest views of the "Roof of the World." The big mountain to the right is Nandi Devi, the highest mountain in British territory. I have heard all sorts of stories of the beauties of the place, and of the wonderful plants found there. As the vegetation on this side of the Himalayas is so totally different from the Sikkim side, I have no doubt that at proper seasons there are some wonderful flowers still to be found there; but one should stay a whole summer to see the flora properly. Botanists generally in India only go in "fine weather"—fair-weather botanists. I don't know a single instance of any botanist collecting a whole season in the interior of the mountain district. The out-of-the-way hills, twelve or fourteen days' march away, are the places to visit.

The gardens of Europeans contain all our favourite English annuals. One sees large bushes of Hydrangeas, Scented Verbenas, Heliotropes, Geraniums, *Solanum jasminoides* flowering profusely; *Gladiolus* and Dahlias simply wild, the latter having acclimatised themselves on all the bare slopes and waste ground. It would well repay a Dahlia fancier to see the masses of single flowers found on the waste spots; every shade of colour may be seen, and many large and splendid flowers; they have become a pest in Naini Tal. Geraniums and Violets grow well, and nearly all English vegetables thrive fairly well. The

Jerusalem Artichoke, too, is now wild in some places. Potatoes are grown in enormous quantities near here, and Naini Tal and the Kumaon district supply the greater part of the North-West Provinces with this article, and although the variety is not first-class the Potatoes are very good eating. I wonder some attempt is not made to introduce a better variety. They sell generally at 3.8 rupees per maund of 80 lb. (or about 4s. 6d.).

Since writing the above I have spent a Christmas at Naini Tal, collecting ornithological and other specimens. One day I came across masses of *Cœlogyne cristata* at an elevation of about 3,000 feet. The ground was covered with *frost* at noon, the branches of the evergreen oaks covered with *Cœlogyne*—rather a cold place. It shows how hardy the plant is.

ARTIFICIAL MANURES IN THE GARDEN.

By MR. A. D. HALL, F.R.H.S.

[Read Nov. 22, 1898.]

THE use of artificial manures in gardens is rapidly increasing, if one may judge from the number of advertisements, and the new firms that are taking to the business; and the object of the present paper is to discuss the principles that should regulate their effective and economical employment. It may of course be argued that of all places artificial manures are least wanted in a garden, inasmuch as practically perfect fruit and vegetables are grown by good cultivation with dung alone. The only question is whether the same results cannot be attained more economically by the assistance of artificial manures, which, again, can be used to meet certain special difficulties of soil and situation in a manner that would otherwise be impossible. It must not be forgotten that artificial manures are powerful tools by which the development of the plant may be shaped by the gardener along certain directions; but like all powerful tools they require to be used with knowledge and discretion, or they will do as much harm as they can be made to do good; and of the large quantities of artificial manures now used by gardeners it can hardly be said that they are, as a rule, bought with due economy. In the Journal of the Royal Horticultural Society, vol. xxi.,

page 68, may be found a series of analyses of manures then on sale for gardeners' use; and putting aside the cases of actual fraud it will be seen that the price paid was generally out of all proportion to the value of the material.

But independently of the question of price there is another disadvantage in the use of these mixed manures: the gardener is unable to locate for future use the cause of any particular effect he may notice as resulting from the application of the manure. If, for example, an application of a simple manure like sulphate of ammonia produces a certain result, cause and effect are definitely connected, and the gardener's experience is richer by a fact for future use; but if the result has been obtained by means of a complex mixture of unknown composition, the gardener's knowledge has not been advanced, and he has no certainty of being able to reproduce or avoid the case. On all grounds—cheapness, security against adulteration, gain of experience—it is better for the gardener to buy the simple manures and compound them according to his requirements.

To learn the composition of the simple manures the gardener should refer to some book, as, for example, to Mr. Cousins' little book on the "Chemistry of the Garden," where also he will find an explanation of the proper method of arriving at the value of a manure. As to the latter an approximate way of arriving at the value of a ton of a given manure is to allow 10s. or 11s. for each per cent. of nitrogen, 1s. 3d. or 1s. 6d. for each per cent. of phosphate, or 2s. if the phosphate is soluble, and 4s. for each per cent. of potash. As an example, a manure containing 6.5 per cent. of nitrogen, 22 per cent. of phosphate, and 4 per cent. of potash is worth about £6 a ton, made up as follows: 6.5 at 11s.=71s. 6d., 22 at 1s. 6d.=33s., 4 at 4s.=16s., total 120s. 6d., to which must be added a certain percentage if the manure is bought in small lots. With this preliminary knowledge of the nature and price of artificial manures, it remains to consider the specific effect of the three constituents, nitrogen, phosphoric acid, and potash, which singly, or in combination, are the essence of every manure.

Speaking generally, the nitrogenous manures promote growth and the vegetative development of the plant, leaf, and shoot, rather than flowers and fruit. For example, a fruit tree overdressed with nitrogen will run to wood, the leafage will be

extensive and very green, the shoots will be long-jointed and soft, the buds will be wood and not fruit buds, the development of fruit will be displaced in favour of continued growth.

Of course for some vegetables it may be an advantage to promote this excessive vegetative development by the use of nitrogen, particularly in early spring, when the plant naturally finds a difficulty in obtaining supplies of nitrogen from the soil. For early crops of Cabbages, Lettuces, Peas, &c., top-dressings of nitrate of soda are a great help to rapid growth and its natural accompaniment of tenderness. Nitrogenous manures differ much in their rapidity of action: two of them, sulphate of ammonia and especially nitrate of soda, are both extremely concentrated and immediately active; they should only be applied when the plant is growing, and several times in small quantities rather than in one application. Of course they are only partial manures, supplying but one element of plant food, and must not be used unless the land is well stocked from other sources with phosphates and potash, or else their continued application will result in the impoverishment of the soil. But in their place, and used with discretion, they are among the most powerful agents the gardener possesses.

It is, however, among the phosphates that the gardener will find his most useful manures. Speaking generally, a garden receives lavish supplies of dung, on the whole a nitrogenous manure, and is somewhat over-rich on this side, if we may judge at least from the prevalence of wood and unfruitful growth among the fruit trees of so many gardens. It is in such places, the ordinary garden which has long been receiving dung, that phosphates and little artificial manure besides, are wanted to promote a better development of flower and fruit.

Phosphates are intimately connected with the various phenomena of reproduction, which we may sum up as the maturity of the plant. Above all they are required to balance and bring to a term the growth induced by free supplies of nitrogen.

Of these bodies nothing is better for general garden use than one of the bone phosphates, bone meal (or, better still, steamed bone flour, as being a finer and more soluble powder), or again one of the cheap phosphatic guanos.

Basic slag is a most excellent phosphatic manure for stiff

soils: it is best dug in at the rate of 6 lb. or 8 lb. per square rod when the land is trenched. Superphosphate is the most active of the manures of this type, but should only be used when the soil contains naturally a fair supply of lime, on the loams and the chalky soils rather than on sands or gravels or the cold clays. One or other of these manures is all but indispensable in a garden: with a supply of steamed bone flour or phosphatic guano, and dung, a gardener need trouble himself but little about other fertilisers.

About the effect of potash, the third of our elements of fertility, little positive is known; but in a general way it may be said that where dung is at all regularly used little is required in the way of specific potash dressings. But where dung is not employed, or where the soil is of a light sandy nature and likely to be deficient in potash, it will be necessary to apply kainit at the rate of 4 lb. or 5 lb. per square rod every second or third year, preferably putting it on in the winter or late autumn.

In some orchards and gardens dung cannot be obtained: in such cases it is necessary to obtain as a basis for the manuring some slowly acting nitrogenous body of an organic origin, such as meat meal, fish guano, or rape dust, digging this into the ground at the rate of 8 lb. to 12 lb. per square rod in the winter. With it should go 4 lb. to 6 lb. per square rod of a phosphatic manure like steamed bone flour or phosphatic guano, and kainit every other year or so. Finally, as the plants are beginning to grow, a little active nitrogen in the shape of sulphate of ammonia or nitrate of soda may be used along with superphosphate. The gardener working without dung should lose no opportunity of taking catch crops of Mustard or Vetches, and digging them into the soil. The land may be brought into splendid condition by heavily manuring with artificials for a crop of this sort, and turning it in a month or two before the ground is wanted again.

A few general directions may be given for the use of artificial manures. The best returns are obtained by applying them to growing, rather than established, plants. I have seen recently planted Strawberries enormously benefited by a dressing of artificial manures that produced no sensible effect on two or three year old plants alongside. As to quantities, 1 oz. per

square yard, or 2 lb. per square rod, is equal to about 3 cwt. per acre: this may be taken as an outside quantity to use of the rich and active nitrogenous manures like sulphate of ammonia or nitrate of soda; of more slowly acting manures like the guanos, two or three times the quantity may be used.

For plants in pots it is better to use manures in solution: for example, nitrate of soda and superphosphate, or 1 oz. of sulphate of ammonia and 3 oz. of superphosphate dissolved in 10 gallons of water makes an excellent liquid manure for finishing, when buds are opening or fruit is swelling. If a compost is to be enriched, let the slowly acting forms of nitrogen, like the guanos or meat meal, be used with phosphates to correspond, and let the manure be mixed with the soil some time before the compost is wanted, for the early stages of the decomposition in the soil of these manures are injurious to tender rootlets.

As to the nature of the manure required for this or that crop little can be said; the gardener has not at his service the knowledge that the farmer possesses of the specific requirements of his crops; it is only for the farm crops that systematic trials have been carried out, like the fifty-year-old experiments at Rothamsted, and the many other stations that have grown up in England and elsewhere. From these experiments and their extension by the practical experience of many years we now know with a reasonable degree of accuracy the specific requirements of each crop on the farm, whether its manure should be mainly nitrogenous or mainly phosphatic, whether potash is wanted or no; whereas we have nothing but general grounds upon which to distinguish between the requirements of a Cabbage or an Apple tree, an Onion or a Rose. It is little use analysing the plant to get this information: the proportions of nitrogen, phosphoric acid, and potash in a plant are not the proportions in which these substances should be supplied in order to best feed the plant. What is present in the smallest proportions is often the particular substance the plant most wants; it is only present in small proportions because the plant finds a special difficulty in getting it from the soil. As an instance of this common fallacy of supposing the composition of a plant's ash gives any guide to its manuring, swedes may be taken: one acre of average swedes removes from the soil 98 lb. of nitrogen, 33 lb. of phosphoric acid, and 149 lb. of potash.

This material would be contained in $5\frac{1}{2}$ cwts. of nitrate of soda, $2\frac{1}{2}$ cwts. of superphosphate, and 11 cwts. of kainit; yet the ordinary manure for swedes, one tested by many years of experience and scores of experiments, is something like 4 cwts. of superphosphate and 1 cwt. of nitrate of soda per acre. Only actual experiments can teach us the requirements of our garden crops, and experiments of a systematic sort are few in number. We shall have in time results from the Experimental Fruit Farm the Duke of Bedford has started at Woburn; in a commercial way we have the trials conducted by Dr. Bernard Dyer at Hadlow for the Permanent Nitrate Committee, but as yet these and other trials are young, and have not reached permanent conclusions. Meanwhile every gardener should have a little experimental plot in his own garden: he will learn much about his crops, and he will learn what no one else can teach him, *i.e.* the special characteristics of the soil he is working on. Such a plot costs but little trouble and becomes more valuable every year. An arrangement like the following gives perhaps the readiest information—seven plots side by side, each one square rod in extent:—

Plot 1. Gets no manure.

Plot 2. Gets an all-round manure. A pound of sulphate of ammonia as a top dressing, 4 lb. superphosphate or basic slag, according to the soil, and 2 lb. kainit.

Plot 3. Gets an excess of nitrogen, using 3 lb. of sulphate of ammonia instead of 1 lb., as in the previous dressing.

Plot 4. Gets no phosphate—the dressing of plot 2 without the phosphate.

Plot 5. Gets an excess of phosphate, the dressing of plot 2, with 12 lb. of phosphate instead of 4 lb.

Plot 6. Gets no potash, the dressing of plot 2 without the potash.

Plot 7. Gets excess of potash—the dressing of plot 2, with 6 lb. of kainit instead of 2 lb.

On some soils it may be well to try an eighth plot with $\frac{1}{4}$ lb. of sulphate of iron added to the dressing of plot 2.

If only a number of gardeners would put down a little trial ground of this kind, growing various crops upon it from year to year, and reporting their results to the Royal Horticultural Society, we should not long remain in our present ignorance of the specific needs of our garden plants. This paper has been

confined to its particular subject—the use of artificial manures in a garden—nothing has been said about cultivation, the foundation of all gardening; nothing about dung, which may be regarded as the basis of all manuring; nothing about the use of lime: these are all points that cannot be neglected. No artificial manure will make up for slovenly cultivation; rather they demand greater care in this direction; but the object of the paper has been to indicate and explain the fact that artificial manures give additional scope to the gardener's art, and that in the hands of a skilful man they may be used to still further combat the difficulties that arise from soil or climate.

THE BOTANICAL GARDEN OF PADUA.

By "ISLANDER."

IN the year 1533, at the suggestion of Bonafede, a new chair was created in the University of Padua and called "Lectura Semplicium." This chair was intended for teaching botany, and is with right claimed to have been the first of its kind in Europe to give public lectures on botanical science.

Later on the want was felt of illustrating these lectures with practical examples, and in consequence in the year 1545 the botanical garden was created for this purpose. (Fig. 110.)

The botanical garden of Padua occupies an area of 20,664 square metres, in the middle of which a circular space, having a diameter of 84 metres, is especially reserved for the different families of plants, according to the natural order of Jussieu. Nearly the whole garden is surrounded by the Alicorno Canal, which at a certain place is captured and by means of a hydrophore (dating from 1575) is made to pass through the whole garden. In the year 1593 leaden tubing was laid, and at present seventeen fountains supply the watering power of the garden.

This marvellous old garden, the oldest in the whole world, has many rare plants to show, some of which are almost as old as the garden itself.

Of these first and foremost must be mentioned the veteran *Vitex Agnus-castus*, which was planted in the year 1550, and was spoken of by Bauhin in 1650 as being then one of the sights of the garden. It is over 5 metres high and has a circumference

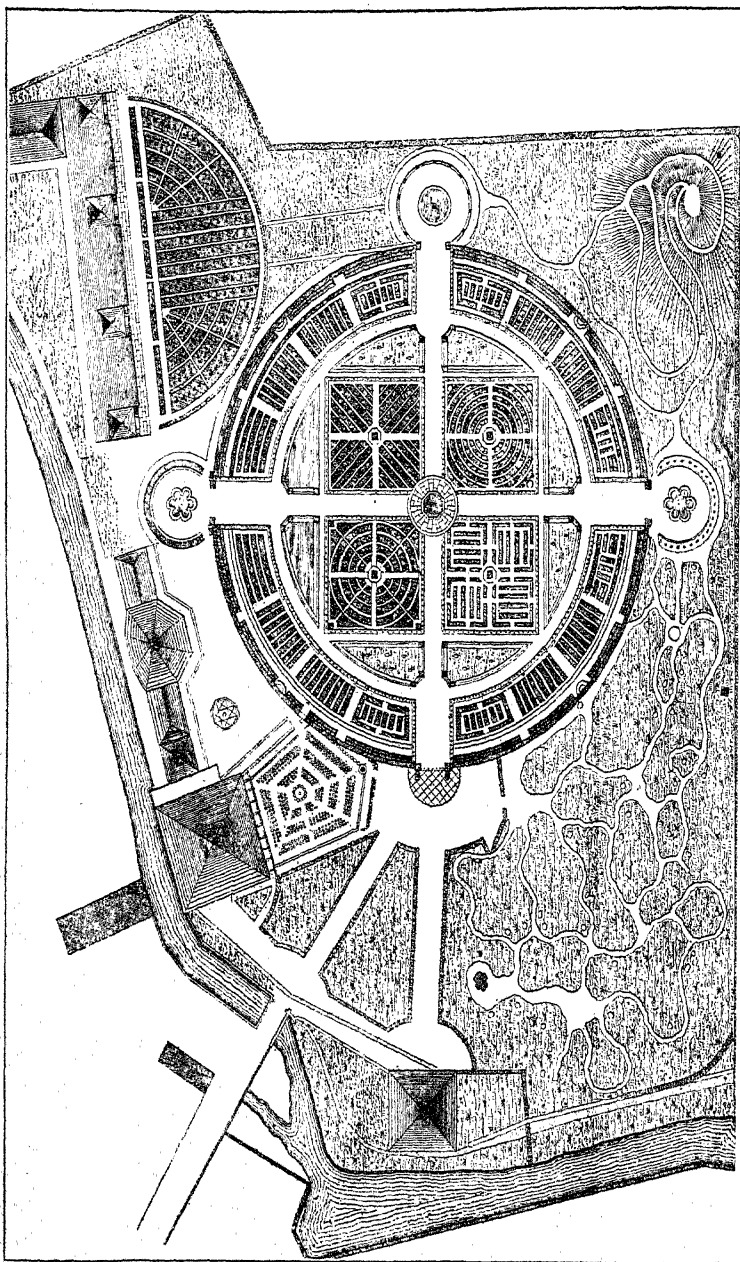


FIG. 110.—GROUND PLAN OF THE BOTANIC GARDEN AT PADUA.

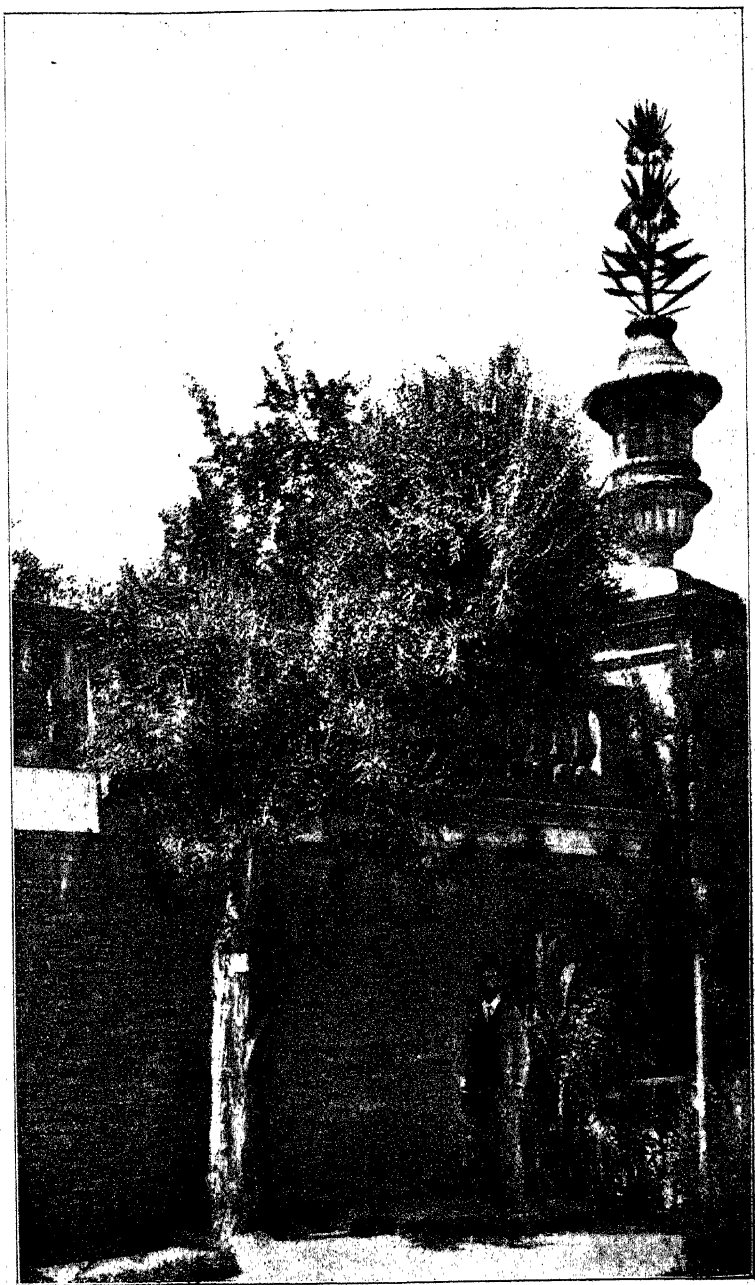


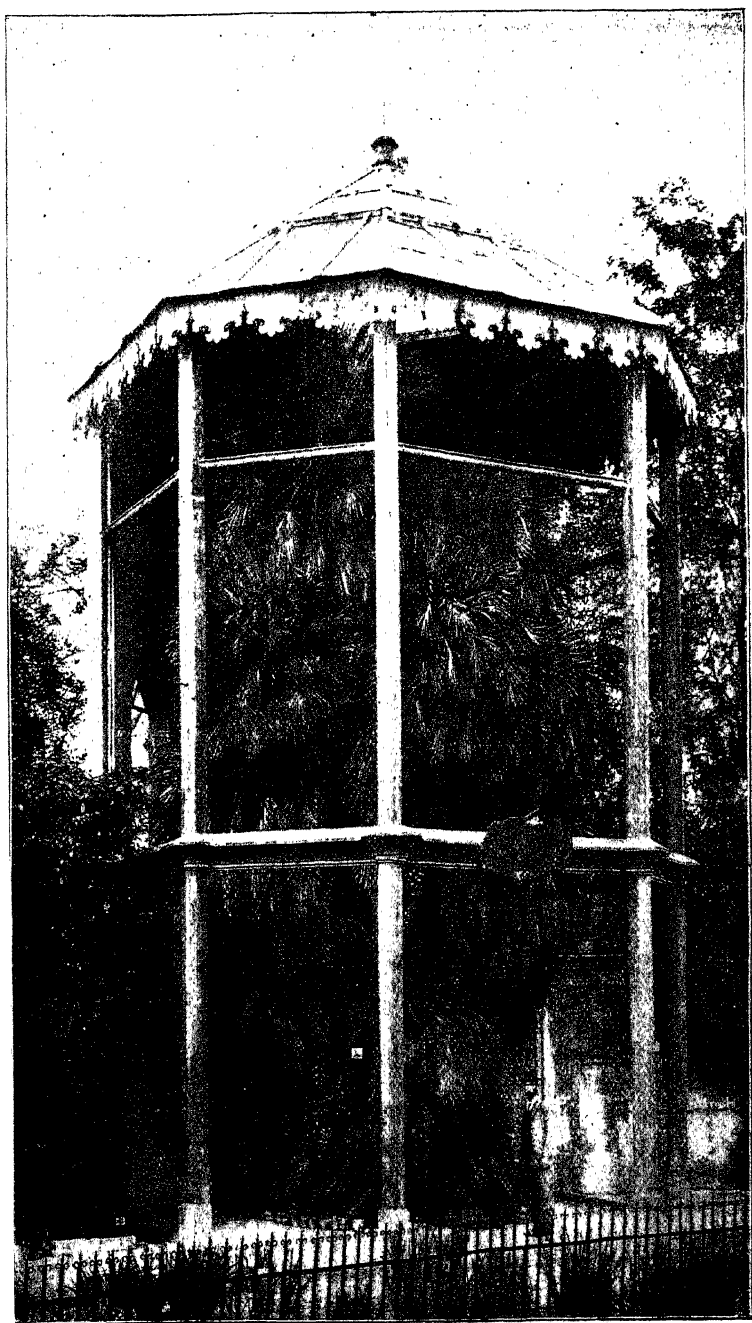
FIG. 111.—VITEX AGNUS-CASTUS, 349 YEARS OLD.

of 1 m. 80 cm. During the winter of 1879-80 the intense cold made it lose all its young branches, but after a rather hard struggle for life, and though its trunk is quite deformed and hollow and its bark corroded, it managed to pull through, and is now as vigorous as ever. (Fig. 111.)

Next to this comes the famous *Chamærops humilis* planted in 1595, and up to 1662 known by the Prefects (Directors) of this botanical garden by the name of *Palma humilis*; later, about 1720, through Pontedera, this plant became known as *Chamæriphe* (*Chamæriphe tricarpos*, *spinosa*, *folio flabelliformi*) and only since about 1737, when Linnæus in his "*Musa Cliffortiana*" called it *Chamærops*, has it here become known under this its proper name. This *Chamærops* is formed of twelve principal branches, measuring each about 65 cm. in circumference and reaching to a height of 9 m. 25 cm. As these proportions seem to be larger than those of this species in its wild state, this particular *Chamærops* received the appellation of *arborescens*. The strange fact about the plant is that it seems to have already attained its maximum height in 1720, when Pontedera in his "*Anthologia sive de Floris natura*" spoke about this plant as being 9 m. in height, and having only three main branches, whereas in 1854 the number of branches is stated to have been nine; whilst the height, since it reached its 9 m., has hardly increased at all. (Fig. 112.)

When Goethe came to Padua on September 27, 1786, this Palm attracted his supreme attention, and the thorough study he made of it served him as a basis for his "*Essay on the Metamorphosis of Plants*," published by him in 1790. Padua, grateful to him for this distinction, recalls this fact in the following inscription over the Palm-house:—

Giovanni Wolfgango Goethe,
Poeta e naturalista,
di quà trasse nel MDCCLXXXVII
il concetto e le prove
della sua metamorfosi delle piante.
Roberto de Visiani,
perchè non mancasse ai posteri
la palma che lo ispirò,
ne riparava nel MDCCCLXXIV
la vetustà gloriosa.

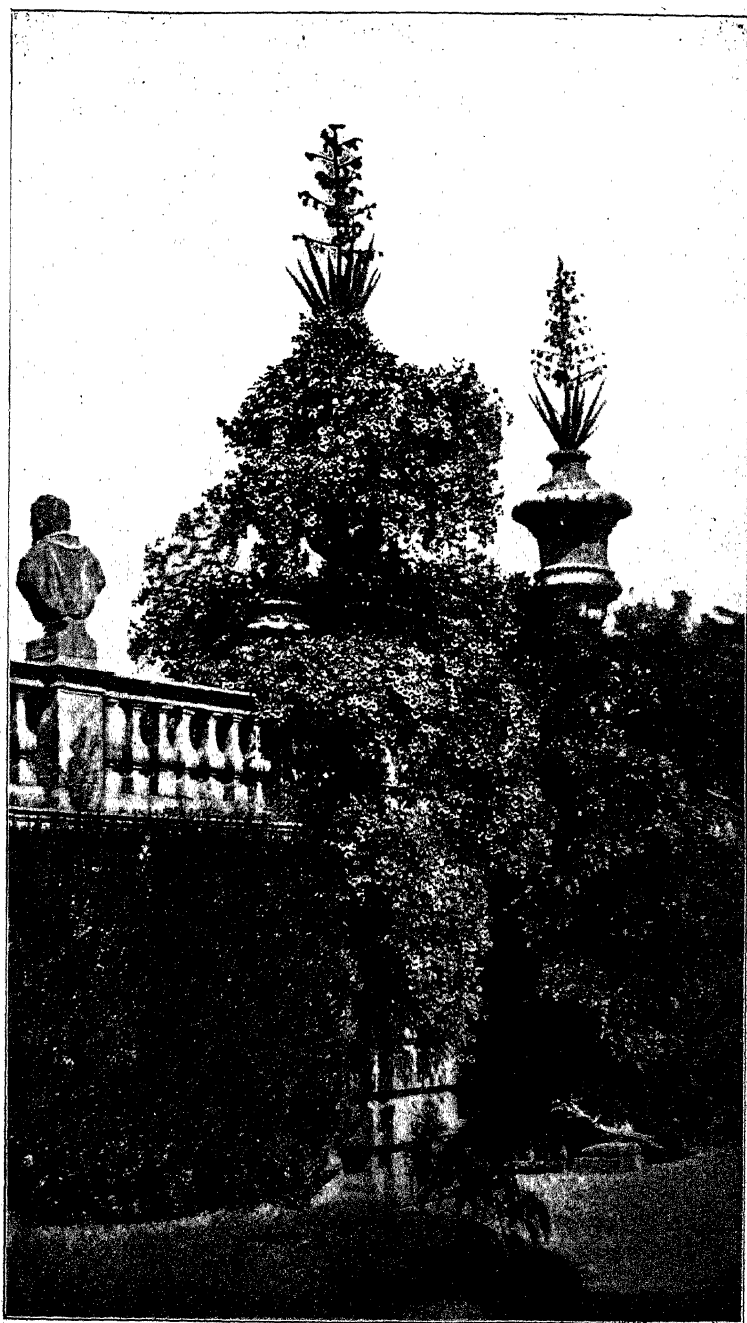


And when Boito, in 1881, gave his "Mefistofele" for the first time in Padua, he was presented with a wreath made of leaves belonging to this *Chamærops*, now always known here under the name of "Palma di Goethe."

Besides this plant, Goethe was attracted by the sight of another one formerly known as *Bignonia radicans*, but in fact, considering Goethe described it as "a blaze of fire, which with its large brick-coloured flowers densely covered the entire wall," was in reality a *Tecoma grandiflora*, a plant which he had never before seen growing and flowering in the open air. (Fig. 113.)

But the plant which in this garden is the most conspicuous one in the eyes of the general public, is assuredly the magnificent *Araucaria excelsa*. It was bought in Milan at the age of ten years; it is now seventy years old and measures more than 20 metres in height, and 1 m. 10 cm. in circumference. The building which protects it has already been added to in height for the third time, and would have had to be elevated again, if, some years ago, its top had not been cut, as it will now again be in a few years, the expense needed for heightening the house not having been voted, because the present foundations of the building would not have borne any further addition to its height. This *Araucaria* is in perfect condition, as might be expected when such a plant is entirely under glass during the rougher months of the year: it is symmetrically covered with its feather-like branches, and nobody who has not seen so perfect a specimen can really understand the wonderful beauty of such a tree. The cutting of its top a few years ago had no influence on its general structure, only, one can see that as its branches become scarcer below, its tendency would be to grow vigorously in height. In order to admire its upper part perfectly, a stone staircase leads up for the first nine metres of its height, and a balcony has been built all round the house, which is octagonal and measures 23 m. 50 cm.

Then the old *Platanus orientalis*, though a permanent invalid, is still every spring full of leaves and later on of flowers and fruit. The base of its trunk measures 6 m. 50 cm., whereas one metre higher it narrows to 70 cm. It was planted about 1680, and is 18 m. high. Its trunk is perfectly hollow, and is large enough to contain several persons inside it; its bark is one



mass of humps, knobs, and enormous warts, and the necrosis, from which it suffered and only got rid of a few years ago, left a longitudinal dead strip, forming about the fourth part of its bark. (Fig. 114.)

There are, in addition, several other remarkable trees, such as *Diospyros Lotus*, 138 years old, 30 m. high and 2 m. in circumference; by botanists of the past called *Guajacum patavinum*.

Ginkgo biloba, 148 years old, 16 m. high and 2 m. 30 cm. in circumference. Grafts from the female plant have been inserted on the original male plant, so that the tree now produces both male and female flowers, and blossoms abundantly.

Two *Magnolia grandiflora*, of same age as the Ginkgo. They are, one 16 m. 50 cm., and the other 17 m. 20 cm. in height by 1 m. 75 cm. and 2 m. in circumference. These two Magnolias seem to have been the very first introduced into Italy.

Gymnocladus canadensis, 138 years old, formerly 21 m. high and 2 m. 60 cm. in circumference. This tree, which was covered nearly to the top by a beautiful specimen of *Wistaria sinensis*, was on the 4th June, 1896, wrecked by a hurricane, and only a stump of 6 m. now remains. (Fig. 115.)

Cedrus Deodara, seventy years old; 22 m. high by 2 m. 50 cm. in circumference.

Populus alba, 138 years old; 30 m. 50 cm. high, by 3 m. 50 cm. in circumference.

Carya olivæformis, 138 years old; about 40 m. high and 2 m. 30 cm. in circumference. This tree is the tallest in Padua.

Cedrus Libani, 138 years old; 19 m. in height and 1 m. 90 cm. in circumference.

Liriodendron tulipifera, 138 years old; 31 m. high and 2 m. 30 cm. in circumference.

The different glass-houses contain the following specimens worthy of note:—

Cycas revoluta, about 118 years old; the trunk measures 1 m. 62 cm. by 1 m. in circumference.

Todea rivularis, having a circumference of 65 cm.

Tornelia fragrans.

Astrocaryum Chonta, 70 years old and 2 m. 8 cm. high.

Cycas circinalis, about 100 years old; 1 m. 25 cm. high and 50 cm. in circumference.



FIG. 114.—*PLATANUS ORIENTALIS*, 219 YEARS OLD.

Pandanus utilis, Bory, about 48 years old ; 4 m. 50 cm. high and 75 cm. in circumference.

Ficus scandens, which covers an entire house, and through a door enters another one, covering a wall 9 m. high.

Livistona australis, 70 years old ; 2 m. 65 cm. high by 70 cm. in circumference.

Dracæna Draco, 98 years old and 5 m. high.

Porlieria hygrometra, about 78 years old and 2 m. 80 cm. high.

For the students a lecture room, capable of seating 200 persons, was constructed in 1842 ; and the illustrations for these lectures are contained in the numerous herbaria, distributed as follows :—

Erbario Generale, begun at the beginning of this century : it contains about 21,000 species in about 60,000 specimens.

Erbario della Flora Dalmatica, 2,500 species in 10,000 specimens.

Erbario Crittogamico, contains collections of Holl, Schmidt and Kunze, Mougeot and Nestler, Ravenel and Rabenhorst.

Books and periodicals are also well provided, the library containing, amongst others, 164 works on botany, mostly used for the identification and nomenclature of plants ; 8,000 volumes on general botanical subjects ; 40 different periodicals ; and other works like *Flora Græca*, *Flora Danica*, all the iconographical works of Reichenbach and Jacquin, *Flora Fluminensis*, Tenore's *Flora Neapolitana*, English botanical works, a complete series of the *Botanical Magazine*, Bulliard's *Champignons*, Martius' *Palme et Plantæ Brasilienses*, the iconographical works of Cupani, Duhamel, Host, Hill, Weinmann, Gallesio, Berlese, Blackwell, Salm-Dyck, Delessert, Waldstein and Kitaibel, the majority of the *Botanici Veteres*, a complete series of Linnæus' editions, and, above all, the very rare edition of the *Herbarium Apuleji Platonici* (Rome, 1479),* the oldest illustrated work on botany.

There are also a large number of botanical manuscripts by such writers as Prospero Alpino, Malpighi, Gabrieli, Cesalpino, Ceni, Pontedera, Haller, Spallanzani, Linnæus, Brocchi, Cavanilles, Delile, Endlicher, Fee, Jacquin, Martius, Mirbel, Sternberg, Treviranus, Willdenow, &c.

* Pritzel gives the date as 1493, and the name of the author as Pseudo Apuleius.



FIG. 115.—GYMNOCLADUS CANADENSIS, 138 YEARS OLD.

The mycological library contains 300 volumes and 2,300 essays, with 210 volumes and essays on lichenology; and the mycological herbarium, the property of the present Director (Prof. Saccardo) contains 16,000 numbers, contributed from about seventeen other public collections, and 15,000 numbers of his own or his correspondents' collection.

In conclusion mention should be made of the fossil plants, consisting of a collection of fossils from Venetia and Dalmatia. The specimen of *Latanites Maximiliani* is supposed to be one of the biggest and most complete known.

OBSERVATIONS ON SOME OF THE PLANTS EXHIBITED.

DECEMBER 13, 1898.

By the Rev. Prof. G. HENSLow, M.A., V.M.H., &c.

LÆLIO-CATTLEYAS.—In calling attention to some so-called "Bigeners" between species of the two genera *Lælia* and *Cattleya* Mr. Henslow observed that we must be cautious lest we are misled by systematists' views of species and genera. Bigeners are well known to be rare; but if classificatory botanists could be always consistent, *Lælia* and *Cattleya* would be regarded as one genus, inasmuch as the perianths, &c., do not differ from each other more than two species of either genus, respectively. The chief distinction upon which these two genera are based is that while *Cattleya* has four pollen masses in one series, *Lælia* has eight in two series, but they are a little unequal. Now these two genera are connected by three others, which have eight pollen masses in two series; but the pollen masses of the upper is often very much smaller than those of the lower series.

Here, then, is a clear case of a graduated set of genera from *Cattleya* to *Lælia*; and it is of course an arbitrary arrangement to separate them to suit the conveniences of classification.

Hence, though we call Lælio-Cattleyas "bigeners," they would seem physiologically to be hybrids between two species of one and the same genus.

ASPARAGUS SPRENGERI.—This was introduced from the Cape about four years ago, and already two varieties have appeared

without any crossing, viz. *compactus* and *densissimus*. They were exhibited by Mr. May.

It is an interesting species in that the true nature of the cluster of needle-like structures, which issue from the stem where the leaf arises (this being reduced to a minute scale) in the garden Asparagus, has been disputed, viz. as to whether they represent leaves or branches. In the present species they appear as true, flat but narrow leaves; so that it thus throws light upon the analogous structures in the common Asparagus.

BEGONIA SOCOTRANA HYBRIDS.—A new race was exhibited by Mr. Veitch, procured by crossing *B. Socotrana* with tuberous Andean Begonias. *B. 'Gloire de Lorraine,'* a hybrid of similar origin, was exhibited for comparison; but this, though very floriferous, is small-flowered; whereas Mr. Veitch's new race resemble ordinary Begonias. Their especial value consists in their flowering at the present time, having acquired the natural habit of *B. Socotrana* in this respect. Again, they are entirely male, the result being that the flowers remain on till they are quite withered. The particular specimen of 'Gloire de Lorraine' shown was the first on which a female flower had been detected.

DRACÆNA GODSEFFIANA.—This monocotyledonous plant is remarkable for its mimetic character, an ordinary form of *Dracæna* having long leaves; and if they be variegated, the colourless parts are in stripes on the leaf; but in this species, which comes from the west coast of Africa, the leaves are oval and spotted with yellow, thus closely imitating the dicotyledon *Aucuba japonica*. The leaves are, of course, curvinerved, and not reticulated as in that plant.

ARISTOLOCHIA GIGAS, var. ORNITHOCEPHALA.—Mr. Henslow described the peculiar method of fertilisation by insects of the flowers of this genus, as recorded in Sachs' "Text Book of Botany," figs. 488, 489, p. 910.

NARCISSUS VIRIDIFLORUS.—Besides the last-named plant, Mr. Kingswell, of Harrow Weald, sent a flower of this rare green-flowered Narcissus. Its native countries are Spain and Barbary, and it was first introduced into this country, according to Paxton, in 1629. It is an autumn-flowering species.

OXALIS CRENATA.—Mr. C. Herrin, of Dropmore, sent some yellow orange-skinned tubers of this plant, a native of Peru, where it is known as Oça. It was first introduced some forty

years ago, as a suggested substitute for the Potato. In speaking of *Oxalis*, Mr. Henslow referred to the history of the distribution of another species, *O. cernua*, throughout the Mediterranean regions. A bulb was sent from the Cape, where it is a roadside weed, to Father Jacintho, a teacher of medicine in Malta, in 1806. Since that date, and from that solitary plant, it has spread all over the island as well as Gozo. It reached Egypt about 1820, and Gibraltar in 1829; and it is now to be found from Gibraltar to the Greek islands, and from Egypt to Morocco. It never seeds in the N. hemisphere, as, being trimorphic, only one of the three forms exists throughout the whole of this area; but it is propagated by means of innumerable little bulbs. It is called by the Maltese 'The English Weed,' and is the most troublesome plant in the island. (Fig. 126.)

THE CARDOON.—Specimens were sent by Miss Breton, Forest End, Sandhurst. It is only a variety of the Globe Artichoke, *Cynara Cardunculus*, var. *Scolymus*, but it is not grown so often as the latter. The edible part consists of the succulent midribs of the leaves. Mr. Henslow alluded to the description of Pliny, who, in speaking of the extravagant luxury of the rich in his day, says that even "thistles" were cultivated, which the very animals refused to eat!

THE DAFFODIL IN AUSTRALIA.

By Mr. G. S. TITHERADGE, F.R.H.S.

On a continent whose vast extent and range of climate make it possible for one to hear of the death of two men in the same week—the one from heat and thirst in the north-west, and the other from cold and exposure during a snowstorm in the neighbourhood of Mount Kosciusko—the Daffodil is grown necessarily under many varying conditions. I shall therefore in this paper deal chiefly with my own experience as a grower near Melbourne, Victoria, and with results of observations made in Sydney, New South Wales, Brisbane, Queensland, and New Zealand. The climate of Melbourne is variable—a hot, dry atmosphere with scorching winds in summer, and in winter moderately cold with occasional frosts. The annual rainfall is almost equal to that of

England, but is never certain. Up to the end of October this year (1898) it was ten inches behind the average. There was no rain near Melbourne, except a couple of showers, from October 1897 until April 1898.

It is usual to commence lifting *Narcissus* bulbs about Christmas, and when grown, as mine are, in very heavy soil, it is a well-nigh hopeless task to attempt to replant before rain comes. With a sandy soil one is not so handicapped. This year it was about the third week in April before the rains broke; as a consequence the bulbs, which do not do well out of the ground, suffered. The Joss flower, which in good seasons is blooming at the beginning of April, was not even planted. This variety recalls a peculiarity in connection with the Tazetta family, which may be worth mention: it is the first of the *Narcissi* to flower in the open at the Antipodes. Some Tazettas are in bloom there in precisely the same month as they are in England, it being autumn and early winter in the one country, and spring and early summer in the other.

I have grown the *Narcissus* both in sandy soil and in a rich black, heavy loam, approaching to clay, and have no hesitation in saying that in the latter the flowers have been superior in substance and depth of colour, notably in the orange-reds. With some of the more delicate varieties I have used sand in planting.

In Australia the bulbs should not be kept out of the ground for very long. When I state that last summer the temperature in Melbourne on nineteen days registered over 100 degrees in the shade, the maximum reaching nearly 110 degrees, the reason will be obvious. This heat was, of course, exceptional. There is nothing like early planting, and at a depth which will preserve the bulbs—if they are to remain for more than one season—from being scorched by the sun. In Brisbane, however, it is not advisable to plant in February as we do in Melbourne. The Director of the Acclimatisation Society's Gardens, to whom I once sent a small collection, assured me that planting in February—which is generally the rainy season—would result in the stewing of the bulbs in the ground; though, away from the coast, in the higher districts it is possible to grow the *Narcissus* with some success.

I have found that bulbs transplanted from Sydney to

Melbourne have flowered a month or six weeks earlier during the first season, but have reverted to their ordinary blooming periods after that. The annual Daffodil Show in Sydney is held at a later date than that of Melbourne, although the former place has a much warmer, moister climate in spring and winter, which one would naturally suppose would give an earlier flowering season.

This would seem to indicate that a certain degree of cold is necessary for the production of early blooms. I say certain degree of cold because while on a visit to New Zealand during the winter and early spring months I was curious to ascertain how many varieties would be in flower in the South Island during July. I reasoned that if Melbourne, which is colder than Sydney, produced earlier flowers, Dunedin, which is colder than Melbourne, should give them still earlier; but the result showed me to be in error. I think none of the trumpets were above ground in Dunedin, and, a fortnight later, the "grass" of some of the earlier ones was just peeping through the ground in Christchurch, farther north, where, before I left, I noticed the Joss in flower. In Wellington (North Island) the Daffodils during August were at their best, and in a district called the Tai-ta, a few miles from the city, in the gardens of a gentleman named Mason, were to be found all varieties growing luxuriantly. Blessed with an ideal climate—frosts are rare, and the temperature in summer seldom above 80°—a copious rainfall, and a good depth of alluvial soil, Mr. Mason produces the finest blooms to be found in the Antipodes. It is a wonderful garden—everything seems to flourish, Rhododendrons and Camellias especially—and is sheltered on all sides by huge Eucalyptus trees, as the Wellington district has the reputation of being very windy. It is said one can always tell a Wellington man, because when he comes to a street corner he instinctively holds his hat on.

While on the subject of blooming periods, it may be noted that Narcissi at the Antipodes do not follow the English order of succession. *N. maximus* is generally the first of the trumpets, then *N. Countess of Annesley*, *Ard Righ* and *Obvallaris*, followed by *N. Henry Irving*, *Queen Margherita*, *Golden Spur*, *King Umberto*, *Blondin*, *Princeps*, and *Michael Foster*, the earliest bicolor. *N. Pallidus præcox* and *Nanus* are comparatively late. *N. Empress* always comes before *N. Horsfieldii*, and, in my

opinion, is the strongest and best all-round bicolor: 60 per cent. of the offsets will flower, and beside it *N. Horsfieldii* is not worth growing. The following are notes of my experience of some of the varieties.

N. Countess of Annesley is the best all-round yellow. *N. Ard Righ* runs it close, but is not healthy in all districts. *N. maximus* is undoubtedly the finest Daffodil I have ever seen, and, as it is the earliest both in Melbourne and Sydney, should be the most valuable. The variety grown by me is known as Bradley's Maximus. Some twelve or fourteen years ago Mr. H. H. B. Bradley, of Sydney, Honorary Secretary of the Horticultural Society, imported a few bulbs from England. Under the influence of soil and climate in time it developed qualities not hitherto associated with it. A mid-season variety in England, it was the earliest to show in its new quarters. A shy bloomer in the old country, it rarely failed in Sydney, except when the previous season had been droughty. From trials made I found that with a cold climate—Southern New Zealand, for instance—and a heavy soil it reverted to its English characteristics, but could be grown most successfully in a light, rich soil and a sunny position.

N. Golden Spur and *N. Henry Irving* are of about equal merit, but will not always thrive under the same conditions. A friend, living only a mile or two away from me, used regularly to exchange the two varieties: he could not grow *N. Golden Spur*, but succeeded admirably with *N. Henry Irving*.

As a rule most *Narcissi* will thrive in Sydney and Melbourne but the following are difficult to keep alive: *English Lent Lily*, single and double; *N. Variiformis*, *Cernuus plenus*, *Minimus*, *Moschatus*, *Cyclamineus*, *Mrs. George Cammell*, *Pallidus præcox*, *Capax plenus*, *Triandrus albus*, *Calathinus*, and *Hale's Silver and Gold*.

N. Colleen Bawn and *N. General Gordon* will perhaps do well for a time and show increase, but they are not to be depended on.

N. James Bateman and *N. Nelsoni aurantius* come into flower too late to do any good. I have never seen the latter with any colour in it.

N. Mary Anderson, notwithstanding its bad reputation, has been most satisfactory; and, as it is supposed by some to be the

single of the Orange Phoenix, I may state that I have seen it flowering in a bed of the latter variety, and have also found Orange Phoenix amongst N. Mary Anderson.

N. Madame de Graaff and Glory of Leyden have proved disappointing, although favourable accounts of them have reached me from the cold districts of New Zealand.

I have been successful with *N. Corbularia monophylla*, grown in the open from acclimatised bulbs from New Zealand, where the conditions are much more favourable for growing bulbs imported from England the first season. In Australia we rarely or never get a flower unless the bulbs are planted in pots or boxes and specially watered. Mine were planted in the open in October, and left to their fate during the long dry summer; the result was a little wilted-looking "grass" and a blind bloom. In about fifteen months, when they were lifted, the bulbs had generally made a great many offsets. *N. poeticus* was lifted first, but at no time do the roots of this section seem to be inactive. I have counted over twenty small offsets on a bulb of *N. Leedsii* Duchess of Brabant, but the same peculiarity is not often noticed in the high-priced varieties. All the *Tazettas* grow like weeds.

I have never been able to indulge in hybridising, on account of my frequent absence from home, but there is a large number of seedlings—mostly the result of hand-fertilisation—in Australia, a great many of which show considerable promise. Most varieties bear seed freely, but it does not always ripen: a hot wind and a dry September will prove fatal. *N. Countess of Annesley* is one of the best, and has been crossed largely with the *Tazettas*; but the experiment is now being tried of planting it late, so that it may come in with *N. Poeticus ornatus*, with which it is proposed to cross it.

N. Obvallaris, *Horsfieldii*, and *Dean Herbert* deteriorate if kept long out of the ground.

The following do well in Australia: *N. Corb. conspicua*, *Countess of Annesley*, *Emperor*, *Queen of Spain*, *Maximus*, *M. J. Berkeley*, *Empress*, *J. B. M. Camm*, *Principes*, *Albicans*, *Cernuus pulcher*, *Mrs. Camm*, *Wm. Goldring*, *N. Incomp. Beauty*, *Cynosure*, *Frank Miles*, *Leedsii*, *Sir Watkin*, *Stella*, *Barrii Conspicuous*, *Flora Wilson*, *Orphée*, *Leedsii Amabilis*, *Duchess of Westminster*, *Katherine Spurrell*, *Minnie Hume*, *Backhousei*

Wm. Wilks, *Triandrus pulchellus*, Burbidgei type, John Bain, Ellen Barr, and *Poëticus ornatus*.

In conclusion I should wish it to be understood that I do not pose as an authority on the daffodil in Australia, and my remarks in this paper are made "with bated breath and whispering humbleness." I may, however, claim to be an earnest student who, in the face of many difficulties, has devoted several years to the subject, and, I think, been instrumental, with others, in spreading the popularity of this beautiful spring flower at the Antipodes.

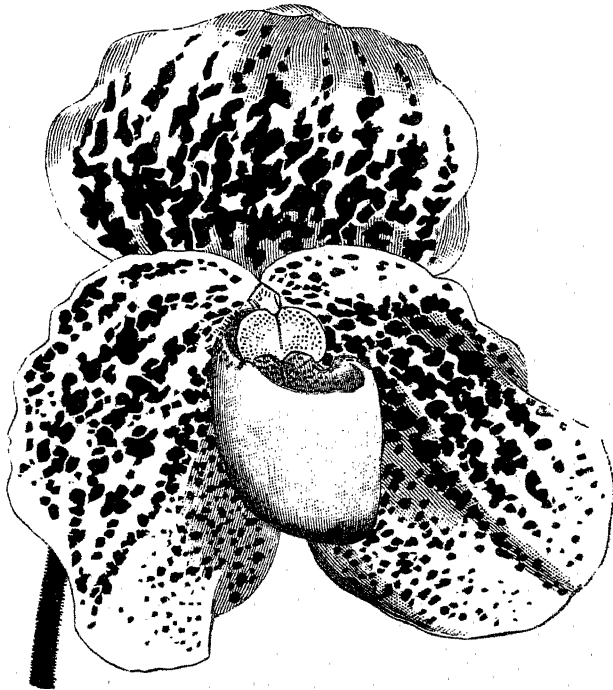


FIG. 116.—*CYPRIPEDIUM GODEFROYÆ LEUCOCHILUM*.
(*Journal of Horticulture*.)

BOOKS PRESENTED TO THE SOCIETY'S LIBRARY DURING THE YEAR 1898.

Presented by Mrs. Holborn.

- "The Colours of Flowers," by Grant Allen.
- "The Fern Garden," by Shirley Hibberd.
- "Field Flowers," by Shirley Hibberd.
- "Wild Flowers of Scotland," by J. H. Crawford.
- "The Shakspeare Flora," by Leo H. Grindon.
- "The Botanist's Guide through England and Wales," 2 vols., by D. Turner and L. W. Dillwyn.
- "Flowers from the Holy Land," by R. Tyas.
- "Bible Plants," by J. Smith.
- "A New London Flora," by E. C. De Crespigny.
- "A Synopsis of British Mosses," by C. P. Hobkirk.
- "Popular Field Botany," by Agnes Catlow.
- "Wayside and Woodland Blossoms," by E. Step.
- "Wild Flowers," 2 vols., by Anne Pratt.

Journal of the Board of Agriculture, vols. i.-iv.

Presented by Sir William Thiselton-Dyer, F.R.S., Royal Gardens, Kew.

Bulletin of Miscellaneous Information, 1897.

Kew Bulletin. Additional Series No. 1.

"Flora of Tropical Africa," parts 2 and 3 of vol. vii.

"Flora Capensis," part 2 of vol. vii.

"Tratado de Abonos," by B. G. Aliño, presented by the author.

Missouri Botanical Garden, Ninth Annual Report.

"The Pests and Blights of the Tea Plant," by G. Watt, presented by the author.

Presented by Dr. Masters, F.R.S.

"Vergleichende Entwicklungsgeschichte der Pflanzenorgane," by Prof. Dr. K. Goebel.

"Anatomie und Physiologie der Pflanzen," by Dr. J. Wiesner.

"Allgemeine Morphologie der Pflanzen," by Dr. F. Pax.

"Lehrbuch der Anatomie und Physiologie der Pflanzen," by Dr. R. Hartig.

"The Bamboo Garden," by A. B. Freeman-Mitford.

"Handbook of Insects injurious to Orchard and Bush Fruits, with means of Prevention and Remedy," by Eleanor A. Ormerod, presented by the Authoress.

"Les Roses," ed. iii., 3 vols., by P. J. Redouté, presented by Mr. J. T Bennett-Poë.

Presented by the proprietors of the *Gardeners' Chronicle*.

Hamburger Garten- und Blumenzeitung, vols. xxii.-xli., vols. xxxvi. and xli. incomplete.

Annales Agronomiques, vols. ii.-ix. and xxiii., vols. iii. and vii. incomplete.

Bulletin de la Société Botanique de France, vols. xiii.-xxxiii. and xlv. parts 1-8.

"List of Roses now in Cultivation at Château Eléonore, Cannes, with Descriptive Notes," by Lord Brougham and Vaux.

BOOKS PURCHASED FOR THE SOCIETY'S LIBRARY DURING
THE YEAR 1898.

- "The Silva of North America," vol. xi., by C. S. Sargent.
- "An Illustrated Flora of the Northern United States, Canada, and the British Possessions," by N. L. Britton and A. Brown, vols. i. and iii.
- "Nature," 56 vols.
- "Flora of Tropical Africa," vol. iii
- "Deutschlands Flora," by H. G. L. Reichenbach und H. G. Reichenbach, f., 22 vols.
- "Flora Pyrenaica," by P. Bubani.
- "Atlas des Plantes de Jardins," by D. Bois.
- "Organographie der Pflanzen," by K. Goebel.
- "Die Gattung *Cyclamen*," by F. Hildebrand.
- "Lehrbuch der Botanik für Hochschulen," by E. Strasburger, &c.
- "The Water Garden," by W. Tricker.
- "Monographie der Myristicaceen," by O. Warburg.
- "Flora of Berkshire," by G. C. Druce.
- "The Chemistry of the Garden," by H. H. Cousins.
- "Handbuch der chemischen Mittel gegen Pflanzenkrankheiten," by M. Hollrung.
- "Garden-making," by L. H. Bailey.
- "British Orchids," ed. ii., by A. D. Webster.
- "English Flower Garden," by W. Robinson.
- "Die Heilpflanzen der verschiedenen Völker und Zeiten," by Dr. G. Dragendorff.

DONORS OF PLANTS, SEEDS, &c., TO THE SOCIETY'S GARDENS
AT CHISWICK DURING THE YEAR 1898.

- ARKWRIGHT, J. H., Hampton Court, Leominster. Primrose Seed.
- ATLEE BURPEE, MESSRS., Philadelphia. Seeds of Sweet Peas, Tropæolums, and Tomatos.
- BARR, MESSRS., King Street, Covent Garden. Vegetable and Flower Seeds.
- BECKER, H., Jersey. One Plant of Red Currant 'Comet.'
- BEDDOME, Colonel, West Hill, Putney. Seedling Begonias.
- BENNETT-POË, J. T., 29 Ashley Place, S.W. Fifty plants of *Costus igneus*.
- BIERBACK, O., Botanic Garden, Belgrade. Thirty-one packets of Seeds.
- BLINCO, C. F., Derbyshire Lane, Hucknall Torkard. Seed Potatos.
- BONAVIA, Dr., Worthing. Seed of *Phaseolus Mungo*.
- BOWERMAN, J., Hackwood Park, Basingstoke. Onion Seed.
- BRETON, Miss, Forest End, Sandhurst. Four packets of Seeds.
- BRODIE OF BRODIE, Brodie Castle, Forbes, N.B. Seed of *Widdringtonia Whytei*.
- BULLEY, A. K., West Kirky, Cheshire. Eleven packets of Seeds.
- BUNYARD, GEO., Messrs., Maidstone. American Blight Destroyer.
- BURT, T. W., Caenwood Towers Gardens, Highgate. Crotons and Dieffenbachias.
- CADDS, T. G. M., 21 Granville Park, Blackheath. Seed of a mauve-coloured Daisy.
- CANNELL, MESSRS., Swanley. Twenty packets of Aster Seeds.
- CARMICHAEL, W., 14 Pitt Street, Edinburgh. Strawberry 'Richard Gilbert.'
- CARPMAEL, Miss, St. Julian's Farm Road, West Norwood. *Dracæna* Plants.
- COCKERILL, T., The Gate House Gardens, Wirksworth. Seed Potatos.
- COLLINS, P., The Cedars, Welland, Malvern. Seed Potatos.
- COOLING & SONS, MESSRS., Northgate Street, Bath. Tomato Seed.
- COON, J. M., St. Austell, Cornwall. Tuberous Begonia Seed.
- COURTAULD, S., Bocking Place, Braintree. Vine Eyes.

- CRANE, D. B., Archway Road, Highgate. Nine varieties of *Violas*.
- CROWLEY, PHILIP, Waddon House, Croydon. *Crotons*, *Dracænas*, *Anthuriums*, &c.
- DAMMANN, Messrs., Naples. Vegetable Seeds and New *Cannas*.
- DEACON, W. S., Cobham, Surrey. Thirteen *Dracænas*.
- DEAN, R., Ranelagh Road, Ealing. Culinary Peas.
- DIRECTOR, Botanic Gardens, Calcutta. Seed of *Ficus altissima*.
- DIRECTOR, Botanic Gardens, Edinburgh. Forty-four packets of Seeds.
- DIRECTOR, Botanic Gardens, Kew. Two hundred and forty-two packets of Seeds.
- DIXON, Messrs. E. P., Queen Street, Hull. Culinary Peas.
- DOBEL, T., Huyton, Liverpool. *Cineraria* Seed and cuttings of twenty varieties of *Chrysanthemums*.
- DOBBIE, Messrs., Rothesay. Collection of *Violas*.
- DOD, Rev. C. WOLLEY, Edge Hall, Malpas. Collection of hardy hybrid Plants.
- DOUGLAS, J., Edenside, Great Bookham. Seedling *Carnations*.
- DRYDEN, Miss, Canons Ashby, Byfield. One packet of Seeds.
- EARLE, Mrs., Woodlands, Cobham. *Dracænas*.
- ELLIOT, Dr., Sutton Court Road, Chiswick. Sixteen loads of Manure.
- ENGLISH, J., Church Road, Upper Norwood. *Dracænas*.
- EVANS, J., Darley Dale, Matlock Bath. *Carnations*.
- FIDLER, Messrs., Reading. Seed Potatos.
- FIFE, T., 3 New Road, Southern Hill, Reading. Alpine *Auricula* Seed.
- FORBES, J., Hawick. *Violas*, *Pentstemons*, and six packets of Seeds of East Lothian Stocks.
- FOSTER, F. S., Havant. Tomato Seed.
- FROST, Messrs. T., Maidstone. Seed Potatos.
- GIBSON, J., Devonhurst, Chiswick. Beans.
- GLAISTER, J. W., Orchardcroft, Darlington. Seed of an unnamed *Cypripedium*.
- GRANTHAM, Lady, Barcombe, Lewes. *Dracænas*.
- GREGORY, Mrs., Hurst Green, Sussex. Scarlet Gum *Eucalyptus*.
- GOODY, J., Clare, Suffolk. Tomato Plants and Vegetable Seeds.
- HALES, W. H., Glebe Road, Brigg. Culinary Peas.
- HALPIN, Mrs., Harvard Road, Gunnersbury. *Dracænas*.
- HANBURY, T., La Mortola, Ventimiglia. Twenty-seven packets of Seeds.
- HENDERSON, Mrs., 170 Wickham Road, Brockley, S.E. *Dracænas*.
- HERRST, H., Kew Road, Richmond. Cuttings of *Choisya ternata*.
- HERRIN, C., Dropmore, Maidenhead. *Dracænas*.
- HOFFMANN, R., Thurlow Park Road, W., Dulwich. *Cœlogyne cristata* and *Begonia* 'Gloire de Lorraine.'
- HOBGIN-PRIESTLY, Enys, Penryn, Cornwall. Two packets of Seeds.
- HOPE, J., 1 Brackley Road, Chiswick. Seed of *Eucalyptus globulus*.
- HUDSON, J., Gunnersbury House Gardens, Acton. Seedlings of *Salvia splendens grandiflora*.
- HUDSON, W. H., 199 High Road, Kilburn. Ten Kaki Plants.
- HUNT, W., Annesley Woodhouse, Notts. Seed Potatos.
- HURST, Messrs., 152 Houndsditch, E.C. Seed Potatos, &c.
- HUTTON, Miss, 9 Girdlers Road, Brook Green. Seed of *Eccremocarpus scaber*.
- JOHNSON, Messrs. W. W., Boston, Lincolnshire. Culinary Peas and Seed Potatos.
- KANE, P. J., Kells, co. Meath. Seed Potatos.
- KEMP, D., Stoke Park, Slough. *Dracænas*.
- LANE, Messrs. H., Berkhamsted. Six Peach Trees.
- LAWRENCE, Sir Trevor, Burford, Dorking. Sixty-three Bulbs of *Crinum Moorei* and Cuttings of *Verbena* 'Ellen Willmott.'

- LANTON BROS., Messrs., Bedford. Culinary Peas.
 LEECH, R. B., Wood Hall, Dulwich. Wallflowers.
 LEEDS ORCHID CO., Roundhay, Leeds. West's Patent Ivorine Labels.
 LEGH, Rev. J. R., Moreton Corbet Rectory, Shrewsbury. Seeds of *Echinonster lobatum*.
 LLEWELLYN, Sir JOHN, Penllergaer, Swansea. *Phormium tenax*.
 LONSDALE, Miss, 21 Oakley Street, Chelsea. Seedling Oranges.
 LYNCH, R. I., Botanic Gardens, Cambridge. Ninety-eight packets of seeds.
 MARSHALL, W., Auchinraith, Bexley. *Dracenas*, *Pelargoniums*, *Begonias*, &c.
 MASTERS, Dr., Ealing. Seeds of Florida Velvet Bean and one plant of *Carica papaya*.
 McLEOD, J. F., Dover House Gardens, Roehampton. Crotons.
 MORGAN, J. H., Priory Park Road, Kew. Two packets of Seeds.
 MORPHETT, G., Hulsewood, Dartford Heath. *Dracenas*.
 MOTTET, —, Quai de la Mégisserie, Paris. Six packets of Seeds.
 MYERS, J., Hinchingsbrooke Gardens, Huntingdon. Seed Potatos.
 NEWPORT, Messrs. W. R., Hillingdon Heath, Middlesex. Tomato Seed.
 NUTTING, Messrs., 106 Southwark Street, E.C. Culinary Peas.
 OUTRAM, A., 7 Moore Park Road, Fulham. Patent Labels and Thermometer Indicators.
 PAINE, C. C., Hillfield, Haverstock Hill. *Dracenas*.
 PALMER, W., Junction Road, Andover. Seed Potatos.
 PARR, J. C., Grappenhall Heyes, Warrington. Seed of *Rhododendron Nuttalli*.
 PAUL, Messrs., Cheshunt. Broccoli Seed.
 PENTNEY, A., Worton Hall, Isleworth. *Dracenas*.
 PFITZER, W., Stuttgart. Three Plants.
 PHILBRICK, Miss, Wakes Colne Place, Essex. Canadian Clover Seed.
 PIGWELL, Messrs. J., Greenford, Middlesex. Carnation 'Jeddah.'
 PIPON, A. T. M., Farningham, Kent. Tomato Seed.
 POTTEN, W., Cranbrook, Kent. Zonal *Pelargoniums*.
 POWLEY, Messrs., Philadelphia, Norwich. Tomato Seed.
 PRITCHARD, Mrs., Ross, Hereford. Fig cuttings.
 RICHARDS, P. G., Hucknall Torkard, Notts. Seed Potatos.
 RIDGEWELL, J. H., Histon Road, Cambridge. Seed Potatos.
 ROSS, C., Welford Park, Newbury. Seed Potatos.
 ROSS, Colonel, Rosstrevor House, Rosstrevor, Ireland. Seed of *Callitris oblonga*.
 RUSSELL, J., Kew Road, Richmond. Tomato Seed.
 SAVILE, Colonel, The Orchard House, Bedford Park. Twelve packets of Seeds.
 SHALIER, G. W., 3 Avenue Road, Brentford. A new Cultivator.
 SHEA, C. E., Foots Cray, Kent. Rhubarb and one Fern.
 SMITH, F., Griffin Brewery, Chiswick. Three loads of Manure.
 SMYTHE, W., Basing Park, Alton, Hants. Two Azaleas.
 STORRIE & STORRIE, Messrs., Dundee. Pentstemon Seeds, &c.
 STOWE, R., Kimbolton. Culinary Peas.
 STUART, Mrs. A., Morningside Drive, Edinburgh. One *Dracena*.
 SUTTON, Messrs., Reading. Vegetable Seeds.
 SWINLEY, Mrs., 54 Madeley Road, Ealing. Three packets of Seeds.
 SYDENHAM, R., Birmingham. Seed Potatos.
 TAYLOR, A., Ash Vale, Surrey. *Dracenas*.
 THOMAS, O., Royal Gardens, Windsor. Seed Potatos.
 THORNE, F. I., Sunningdale Park, Berks. Twenty-five *Amaryllis* Bulbs.
 THURLOW, Major, 80 Ashley Place, S.W. *Acenas*.
 TODD, H. M., 239 Goldhawk Road, W. Vine Eyes.
 TOOGOOD, Messrs., Southampton. Vegetable Seeds.
 TURNER, C., Slough. Twenty varieties of Pinks.

- VEITCH, Messrs. J., Chelsea. Tulips, Cannas, early-flowering Chrysanthemums, and collection of Seeds of Annuals, &c.
- VEITCH, Messrs. R., Exeter. Vegetable and Flower Seeds.
- VICKERY, F., Bentworth, Alton, Hants. Seed of a White Vetch.
- VILMORIN, Messrs., Paris. Fifty Plants of Strawberry St. Joseph.
- WAKEFIELD, Mrs., Belmont, Uxbridge. Seeds of Dahlia 'Zimpani.'
- WARD, A., Stoke Edith Gardens, Hereford. Palm Seeds.
- WARD, Messrs. W., Darlington. Vegetable Seeds.
- WATKINS & SIMPSON, Messrs., Exeter Street, Strand. Vegetable and Flower Seeds.
- WEBBER, E. R., St. Catherine's Hill, Worcester. Seed Potatos.
- WILKS, Rev. W., Shirley, Croydon. Three packets of Seeds.
- WILSON, J. H., Handsworth, Sheffield. Tomato Seed.
- WOODWARD, Captain E. M., The Leicestershire Regiment. Five packets of Seeds from British East Africa.
- WRIGHT, J., 8 Rose Hill Road, Wandsworth. Beet Seed Ashgrove.
- WRIGHT BROS., Messrs., Market Place, Mansfield. Culinary Peas.
- WYTHES, G., Syon House Gardens, Brentford. Vegetable Seeds.
- YOUNG, J., Zoological Society's Gardens, Regent's Park, N.W. Celosia Seed.



FIG. 117.—MILTONIA \times LEUCOGLOSSA; see page clxvii. (*Gardeners' Magazine*.)

EXTRACTS FROM THE PROCEEDINGS

OF THE

ROYAL HORTICULTURAL SOCIETY.

GENERAL MEETING.

JANUARY 11, 1898.

Mr. GEORGE BUNYARD, V.M.H., in the Chair.

Fellows elected (49).—J. E. Ames, Miss A. H. Ault, Frederick E. Boyes, W. C. Bull, J. P. Capell, Isaac Carr, Frank Chapman, Howard Chapman, Gilbert Christy, J. Court, G. P. Darby, A. H. Davis, O. E. Dickinson, Capt. R. T. Dixon, R.E., Rev. G. F. Eyre, Hon. Mrs. Forster, Upcott Gill, R. Greenfield, Jun., George F. Griffin, Hon. Adele Hamilton, W. Hayes, B.A., William Howe, W. Brouncker Ingle, W. R. Knaggs, Mrs. G. Lang, T. J. Le Poidevin, Henry Little, Capt. W. Luard, R.E., L. Jacob Makoy (Belgium), T. Marsh, Herbert E. Molyneux, P.A.S.I., William C. Morris, Walter F. Morris, F. W. Norman, Armand Pagés (France), Fred Perkins, Hon. Mrs. Fox Powys, William J. Prewett, H. R. Richards, W. Roberts, Mrs. M. J. Shanks, Herbert F. Simonds, Capt. R. Percy Smith, T. G. Swales, John C. Tallack, Edwin A. Wallis, James Webster, M. W. Montague-White, C. K. Wild.

Society Affiliated (1).—East Anglian Horticultural Club.

ANNUAL GENERAL MEETING.

FEBRUARY 8, 1898.

Sir TREVOR LAWRENCE, Bart. (President of the Society),
in the Chair.

The Minutes of the last Annual General Meeting, held on February 9, 1897, were read and signed.

Fellows elected (62).—Miss Alexander, J. E. T. Allen, Mrs. G.

Arbuthnot, John Arrowsmith, George Bacon, W. Bateson, F.R.S., F. A. Billings, Robert W. Bourne, H. H. Boyle, F. W. Briscoe, F. W. Butterfield, Mrs. G. Buxton, H. M. Carré, Theodore Carter, Mrs. Mortimer Collier, Hawtrey Collins Splatt, Charles Cresser, Frank Crisp, J.P., F. J. Cullen, W. J. Cunliffe, Mrs. C. Montague Dean, Mrs. Alfred Deedes, Mrs. Claude Erskine, Miss Evans-Freke, Mrs. Alexander Ewing, Thomas Forbes, Lady Margaret Gore, George Grossmith, Mrs. J. P. Hartree, A. T. Hawkins, W. Heath, J. E. Hill, Percy D. Jones, William H. Joy, Miss Helen Kaye, P. O. Knowles, Archibald Mackellar, James Martin, Mrs. McCalmont, Lawrence McGreale, Lady Cecil Scott Montague, Mrs. Lothian Nicholson, Earl of Onslow, G.C.M.G., W. T. Pennal, Mrs. Wilton Phipps, S. H. Poole (South Africa), Frank Rand, Mrs. Rogers, Mrs. Royds, Robert Slowe, John Smith, Mrs. Soltan-Symons, Miss K. M. Spong, W. S. Staff, Edward Stone, Dr. Thorne, William H. Walters, Mark Warner, John H. Wilson, John Wolton, E. Wood-Calvert, Mrs. Dallas Yorke,

Societies Affiliated (5).—Borough of Hanley Horticultural Society; Ladywell, Lewisham, and District Cottagers' Horticultural Society; Ludlow Chrysanthemum and Fruit Society; Mables Horticultural and Fanciers' Society; Witham Flower Show Society.

Messrs. Harry Turner, V.M.H., and Mr. George Bunyard, V.M.H., were appointed scrutineers of the ballot.

Mr. Henry J. Peason proposed, and Mr. Geo. Gordon, V.M.H., seconded, a vote of thanks to the retiring members of Council, Messrs. Norman Cookson, J. T. Gabriel, and James Douglas, both speakers emphasising the great and ungrudging service rendered to the Society for many years by Mr. Douglas.

This proposal was carried with acclamation.

To fill the vacancies thus caused, the following gentlemen were proposed, viz.: Sir Frederick Wigan, Bart., Mr. J. Gurney Fowler, and Mr. James Hudson, V.M.H.

Upon the report of the Scrutineers, the President declared these gentlemen duly elected Members of Council.

The President, Sir Trevor Lawrence, Bart., moved the adoption of the Report for the past year, drawing attention to the addition which had recently been made to the privileges of Fellows by securing the services of the eminent Chemist, Dr. Augustus Voelcker, as Consulting Chemist to the Society, so that Fellows

could now obtain, at less than half cost, analyses of soils and manures, and advice as to what artificial manures to apply to their particular soils or crops.

Dr. Maxwell Masters, F.R.S., seconded the adoption of the Report, warmly congratulating the President and Council on the wonderful advance made by the Society in the past ten years, and thanking them very heartily in the name of the Fellows for securing Dr. Voelcker's services as Chemist, and for appointing the Rev. George Henslow, M.A., to be Professor of Botany to the Society.

The motion for the adoption of the Report, having been put to the meeting, was declared to be carried unanimously.

A vote of thanks to the President, proposed by Dr. Ince and seconded by Mr. George Wythes, V.M.H., concluded the business of the meeting.

REPORT OF THE COUNCIL FOR THE YEAR 1897-98.

The year 1897 will long be remembered as the Diamond Jubilee year of Her Most Gracious Majesty, Patron of our Society—remembered, too, for the innumerable projects set on foot in celebration of the event.

In the Report for 1896 the Council announced that they had no intention of adding to the number of projects by starting any ambitious Horticultural Celebration, which would lay any strain upon the resources of individual Fellows. They stated that they proposed to establish a Medal of Honour in Horticulture, and that they had obtained the sanction of Her Majesty to call it the Victoria Medal.

This proposal has been duly carried out: the medal has been prepared, and conferred on sixty recipients distinguished in various ways in our Art and Science; and it is believed to be the only medal associated with Her Majesty's Diamond Jubilee, with the exception of the one founded by herself. It is, moreover, the only Horticultural distinction in this country that is conferred for personal merit only, and is entirely unconnected with prize-winning.

By their action in this matter the Council consider that they have commemorated Her Gracious Majesty's Jubilee in a becoming and enduring manner; in a manner absolutely distinct from all other celebrations; in a manner that lays no tax upon the

Fellows of the Society; in a manner distinctly to the advantage and encouragement of horticultural skill and effort; and, lastly, in a manner which will carry down to all future generations of Horticulturists the memory of Queen Victoria's long and happy reign.

Under the head of ordinary expenditure at Chiswick £1,850 has been spent on the general work and maintenance of the gardens. Amongst other work, House No. 11 has been partially, and No. 10 entirely rebuilt, whilst No. 5, devoted to Peaches, has been raised in height and a new roof put on. All this work has been done by the Society's own staff of men. The receipts by sale of surplus produce amount to £357, making the net ordinary cost of the gardens £1,493.

At Westminster, twenty Fruit and Floral Meetings have been held in the Drill Hall, James Street, Victoria Street, and fifteen Committee Meetings have been held at Chiswick, besides the larger Shows in the Temple Gardens on May 26, 27, and 28; and at the Crystal Palace on September 30, October 1 and 2. Lectures have been delivered at seventeen of the Meetings, exclusive of those given at the Crystal Palace. The number of awards granted by the Council, on the recommendation of the various Committees, has been as follows:—

Award	At provincial shows	Affiliated societies	On recommendation of				Total
			Fruit committee	Floral committee	Orchid committee	Narcissus committee	
Gold Medal	1	—	6	5	2	—	14
Silver-gilt Flora	5	—	—	40	8	2	55
Silver-gilt Knightian	2	—	16	—	—	—	18
Silver-gilt Banksian	—	—	3	28	4	—	35
Silver Flora	7	14	—	79	28	4	132
Silver Knightian	1	30	19	—	—	—	50
Silver Banksian	11	—	19	81	39	3	152
Bronze Flora	—	9	—	7	—	—	16
Bronze Knightian	—	—	4	—	—	—	4
Bronze Banksian	—	27	1	24	2	—	54
First-class Certificate	—	—	—	24	25	5	54
Award of Merit	5	—	35	209	91	6	346
Botanical Certificate	—	—	—	4	27	—	31
Cultural Commendation	4	—	16	1	25	—	46
Total	36	80	119	502	251	20	1008

[Ninety Bronze Banksian Medals have been granted to Cottagers' Societies.]

The Council must again express their opinion that there still appears to be a tendency to multiply unduly the awards recommended, and they earnestly request the several Committees to consider seriously whether there is not a real danger of impairing the value of these distinctions by such increase of their number; and whether it would not be possible, as well as politic, to be somewhat less generous in the recommendation of awards during the ensuing year. This is a question which the Council cannot but regard with solicitude, and they hope that every Member of the Committee will consider that he has a real individual responsibility for the welfare of the Society in this matter.

On Wednesday, July 14, the Council invited all the Members of the several Committees to lunch with them at Chiswick, and to examine the Gardens. After the Luncheon, an address was delivered by Dr. Maxwell Masters, F.R.S., on the possibilities of an extended usefulness of the Gardens. A full account of the proceedings will be found in the *Journal*, vol. xxi., p. 160.

The Council desire to draw the attention of all Fellows of the Society to the more extended use which the Scientific Committee might be to them if they availed themselves more freely of their privileges in submitting instances of diseases of, or injuries to plants, caused by insects or otherwise. The Scientific Committee is composed of gentlemen qualified to give the best advice on all such subjects, either in respect to the prevention or cure of disease. The Committee is also glad to receive specimens of any subjects of Horticultural or Botanical interest.

The Council wish to express their thanks to the Director of the Royal Gardens, Kew, for allowing them to consult Mr. Massee, F.L.S., on the fungoid diseases, &c., brought before the Scientific Committee, and to that gentleman for his readiness in giving them the advantage of his knowledge and advice.

That Fellows, whether near or at a distance, may derive as much benefit as possible from their connection with the Society, the Council have recently appointed Dr. J. Augustus Voelcker, M.A., Consulting Chemist to the Society, and have entered into an arrangement with him whereby all Fellows who are Amateurs or *bonâ fide* Gardeners may obtain, at very small cost, analyses of Manures, Soils, &c., or advice as to what description of Chemical Manure will be most suitable and profitable for

application to any particular soil. The Council wish to draw particular attention to two points, viz :—

(i.) That Fellows desiring an analysis must follow explicitly and exactly the directions laid down in the book of arrangements 1898, and

(ii.) That Fellows who are in any way commercially interested in any Artificial Manure Trade or Horticultural business cannot claim Dr. Voelcker's assistance as Fellows; but if they wish to consult him, must do so in the ordinary way of business.

The Society's Great Show held (by the continued kindness of the Treasurer and Benchers) in the Inner Temple Gardens, was as successful as ever, and it is a matter of satisfaction to the Council to find that this Meeting is now universally acknowledged to be the leading Horticultural Exhibition of this country. The best thanks of the Society are due to all who kindly brought their plants for exhibition, or otherwise contributed to the success of this Show.

The Exhibition of British Grown Fruit held by the Society at the Crystal Palace on September 30, October 1 and 2, was, considering the season, eminently satisfactory. Full particulars will be found in vol. xxi., part 3 of the *Journal*, which will be issued in the course of a few weeks.

A certain amount of dissatisfaction has arisen from the fact that whereas classes have been provided specially for amateurs and gentlemen's gardeners, and also for nurserymen, there have been no classes in which growers for market could properly exhibit. This will in future be avoided by the addition of a division for growers for market only.

As an object-lesson in British Fruit cultivation this Annual Show stands unrivalled, and is of national importance. The Council invite Fellows and their friends to support it, for it cannot be too widely known that the continuance of the Show is absolutely dependent on at least £100 being raised by subscription each year towards the Prize Fund. The Show involves the Society in a very large expenditure without the possibility of any return. The Council have therefore established the rule that they will not continue it unless sufficient interest in it is taken by Fellows and their friends to raise £100 towards the Prize Fund. Subscriptions for this purpose should be sent at once to the Secretary, 117 Victoria Street, Westminster; and if

the list prove satisfactory the Schedule will be issued in April, and the Show held on September 29, 30, and October 1, 1898. The list of subscribers for 1897 will be published in part 3 of vol. xxi., of the Society's *Journal*.

A deputation was sent by the Council, at the invitation of the local authorities, to attend the great Horticultural gathering at Shrewsbury in August. Full particulars of this visit will be found in the Society's *Journal*, vol. xxi., p. civ. The Council gladly embraces this opportunity of congratulating Shrewsbury on the magnificent display of Horticultural skill and enterprise made at their show, and of recording the very great pleasure which this visit gave them, and their appreciation of the great courtesy and hospitality with which they were received.

An invitation has been received and accepted for a similar deputation to visit a Show to be held at Newcastle-on-Tyne, on July 13, 14, and 15, 1898, by the Botanical and Horticultural Society of Northumberland, Durham, and Newcastle-on-Tyne.

The *Journal* of the Society has been continued so as to enable Fellows at a distance to enter more fully into, and reap the benefits of the study and work of those actively engaged at headquarters. Vol. xx., part 3, and parts 1 and 2 of vol. xxi. were issued during the year, and vol. xxi., part 3, will be ready in March.

An examination in the principles and practice of Horticulture was held on April 6, concurrently in different parts of the United Kingdom, a centre being established wherever a magistrate, clergyman, schoolmaster, or other responsible person accustomed to examinations would consent to superintend one on the Society's behalf, and in accordance with the rules laid down for his conduct. No limit as to the age, position, or previous training of the candidates was imposed, and the Examination was open to both sexes. 181 candidates presented themselves for examination. The names and addresses of those who succeeded in satisfying the examiners, together with the number of marks assigned to each, will be found in the Society's *Journal*, vol. xxi., page 123.

It is proposed to hold a similar examination in 1898, on Tuesday, April 5. Candidates wishing to sit for the Examination should make application during February to the Secretary, Royal Horticultural Society's Office, 117 Victoria Street, Westminster.

The Council have heard with much pleasure that G. W. Burrows, Esq., a Member of the Court of the Worshipful Company of Gardeners, has most kindly offered, in connection with the Society's 1898 Examination, a Scholarship of £25 a year for two years, full particulars of which will be found in the Society's Arrangements for 1898, lately issued to all Fellows. Another similar Scholarship has been promised for 1899, by the Rt. Hon. the Lord Amherst of Hackney, through the same Worshipful Company.

Acting in conjunction with the Lindley Trustees, the Council have devoted considerable attention to the Library. All serial publications have been kept up to date, a large number of valuable volumes have been bound, and the following new books, amongst others, added to the Library, viz.:—"The Flower Garden of Ornamental Bulbous Plants," Labouret's "Monographie de la Famille des Cactées," Sweet's "Florists' Guide," "The Floral Cabinet and Magazine of Exotic Botany," "The Yew-Trees of Great Britain and Ireland," &c., &c.

The hearty thanks of the Society are due to all the Members of the Standing Committees, viz. the Scientific, the Fruit and Vegetable, the Floral, the Orchid, and the Narcissus Committees, for the kind and patient attention which they have severally given to their departments.

A special and very hearty record of thanks is also due to N. N. Sherwood, Esq., and to C. J. Grahame, Esq. The former gentleman has intimated to the Council his intention of placing a Ten Guinea Silver Cup at their disposal annually, and the latter has enabled the Council to very largely increase the prizes offered for Roses on June 28.

The best thanks of the Society are also due to all those who, either at home or abroad, have so kindly presented books to the Library or plants or seeds to the Gardens. A list of the donors has been prepared, and will be found in the Society's *Journal*, vol. xxi., part 3, 1898, which will be issued in March.

The Council wish to express, in their own name and in that of the Fellows of the Society, their great indebtedness to all who have so kindly contributed, either by the exhibition of plants, fruits, flowers, or vegetables, or by the reading of papers, to the success of the fortnightly Meetings in the Drill Hall. They are glad to find by the increased and increasing number of visitors

that the Society's fortnightly Meetings are becoming better appreciated by the Fellows and Public in general. In their judgment these shows, which take place at short intervals throughout the year, furnish horticultural displays and teach horticultural lessons which cannot be obtained elsewhere in the kingdom.

The papers read at these Meetings, which have been or will shortly be published in the *Journal*,* are as follows:—

- Mar. 9. "Microscopic Gardening," by Professor Marshall Ward, F.R.S.
 „ 23. "The Effect of Bud Transference on Fruits," by the Rev. Gordon Salmon, M.A.
 April 13. "Artificial Manures," by Mr. J. J. Willis.
 „ 27. "Winter and Spring Bedding," by Mr. A. Dean.
 May 11. "Diseases of Plants," by Mr. G. Massee, F.L.S.
 June 15. "The Physiology of Pitcher Plants," by Professor S. H. Vines, F.R.S.
 „ 29. "Storing and Preserving Fruit," by Mr. J. Cheal.
 July 13. "Mutual Accommodation between Plant Organs," by Professor Henslow, M.A., V.M.H., F.L.S., &c.
 „ 27. "Garden Insects," by Mr. W. D. Drury.
 Aug. 10. "Cross Fertilisation of Florists' Flowers," by Mr. James Douglas.
 „ 24. "Plums," by Mr. A. H. Pearson.
 Sept. 7. "Nepenthes," by Mr. Harry J. Veitch, F.L.S.
 „ 21. "Cyclamens," by Mr. W. Iggulden.
 „ 30. "Progress in Fruit Growing during the Queen's Reign," by Mr. Geo. Bunyard, V.M.H.
 Oct. 1. "Progress in Vegetable Growing during the Queen's Reign," by Mr. A. Sutton, V.M.H., F.L.S., &c.
 „ 2. "Progress in Market Gardening during the Queen's Reign," by Mr. J. Assbee.
 „ 12. "Orchid Breeding," by Mr. C. C. Hurst.
 Nov. 9. "Roots," by Professor F. W. Oliver, D.Sc.
 „ 23. "Horticultural Exhibitions and Schedules," by Mr. John Wright, V.M.H.
 Dec. 14. "Sporting in Chrysanthemums," by Professor Henslow, M.A., V.M.H., F.L.S., &c.

* Back numbers of the *Journal* can be purchased by Fellows at reduced rates.

The Council are glad to be able to announce that they have appointed the Rev. George Henslow, M.A., V.M.H., F.L.S., &c., to be Professor of Botany to the Society, and Professor Henslow has kindly undertaken to give addresses at a number of the 1898 meetings, drawing attention to interesting points connected with some of the plants, &c., exhibited. The Council are confident that these "Demonstrations" will be greatly appreciated by the Fellows.

The Council have the sad duty of recording the death of fifty-three Fellows during the year, and among them they regret to find the names of Dr. Robert Hogg, one of the most staunch and energetic supporters of the Society, and the leading authority in Fruit nomenclature, James Bateman, the pioneer of Orchid culture in this country, and author of the "Orchidaceæ of Mexico and Guatemala," Lady Ducie, Lady Matheson, Sir Thomas Parkyns, Rev. F. C. Cass, Sir George Meyrick, Marchioness of Drogheda, Dowager Lady Fortescue, Sir John Thurston, Colonel Trevor-Clarke, William Head, Robert Owen, Lady Fitzhardinge, James Cocker, George Rennie, Sir James Maitland, Francis Fell, and one whom all gardeners loved, the Princess Mary, Duchess of Teck.

The following Table will show the Society's progress in regard to numerical strength during the past year:—

DEATHS IN 1897.				FELLOWS ELECTED, 1897.			
		£	s. d.			£	s. d.
Life Fellows.....	10	0	0 0	4 Guineas	1	4	4 0
4 Guineas	4	16	16 0	2 „	97	203	14 0
2 „	16	33	12 0	1 „	315	330	15 6
1 „	17	17	17 0	Associates	1	10	0
				Affiliated Societies	9	12	12 0
	53	£68	5 0	Commutations	5		
				= £120. 15s.			
					428	£551	15 6
				Deduct Loss.....	134	8	0
				Net Increase in Income	£417	7	6
RESIGNATIONS.							
		£	s. d.				
4 Guineas	0	0	0 0	New Fellows, &c.	428		
2 „	13	27	6 0	Deduct Resignations and			
1 „	37	38	17 0	Deaths.....		103	
	50	£66	3 0				
Total Loss	103	£134	8 0	Numerical Increase.....	325		

A scheme for the affiliation of Local Horticultural Societies

was put forward in 1890, and ninety-one Local Societies have availed themselves of it. The Council express the hope that Fellows will promote the affiliation of Local Horticultural and Cottage Garden Societies in their own immediate neighbourhood.

At the request of some of the Fellows, the Council have arranged to send a reminder of every Show (in the week preceding it) to any Fellow who will send to the Royal Horticultural Society's Office, 117 Victoria Street, Westminster, twenty-two halfpenny postcards, *fully addressed* to himself, or to whomsoever he wishes the reminder sent.

The Council recommend that the Salaries of the principal Officers of the Society—the Secretary, the Cashier, the Superintendent, and the Assistant-Superintendent should continue as heretofore.

The Programme for the ensuing year will be found in the "Arrangements for the Year 1898," lately issued to all Fellows.

Subjoined is the usual Revenue and Expenditure Account, with the Balance Sheet for the year ending December 31, 1897.

ROYAL HORTICUL

ANNUAL REVENUE AND EXPENDITURE

Dr.

	£	s.	d.	£	s.	d.
To ESTABLISHMENT EXPENSES—						
Salaries and Wages	685	5	0			
Rent of Office	173	3	0			
Printing and Stationery	209	8	11			
<i>Journal</i> —Printing and Postage ...	605	19	8			
Postages	99	15	3			
Coal and Gas	5	4	8			
Donation to Auricula and Primula Society	10	0	0			
Miscellaneous	105	12	3			
Commission on Advertisements ...	28	14	6			
Painting Orchids	37	11	0			
				1,960	14	3
„ VICTORIA MEDAL OF HONOUR ...				174	14	3
„ SHOWS and MEETINGS—						
Rent of Drill Hall and Cleaning ...	104	15	0			
Temple Show	609	19	7			
Crystal Palace Fruit Show	254	3	1			
				968	17	8
„ PRIZES and MEDALS—						
Rose Show	37	5	0			
Committee Awards, &c.	371	10	2			
Expenses, Floral Meetings & Conferences	40	14	4			
Labour	76	4	6			
				525	14	0
„ CHISWICK GARDENS—						
Rent, Rates, Taxes, and Insurance ...	237	8	3			
Superintendent's Salary	200	0	0			
Pension, late Superintendent	180	0	0			
Labour	759	1	5			
Implements, Manure, Soil, Packing, &c.	123	11	0			
Coal and Coke	184	15	0			
Repairs	80	12	1			
Water and Gas	12	3	5			
Miscellaneous	73	14	11			
				1,851	6	1
„ BALANCE TO GENERAL REVENUE				5,481	6	3
ACCOUNT				822	7	4
				£6,303	13	7

ROYAL HORTICULTURAL SOCIETY.

BALANCE SHEET, 31st DECEMBER, 1897.

	£	s.	d.	£	s.	d.	£	s.	d.
To SUNDRY CREDITORS ... ..	...	...	...	58	2	8			
" SUBSCRIPTIONS, 1898, paid in Advance	94	10	0						
" ADVERTISEMENTS, 1898, paid in Advance	7	6	3	101	16	3			
" LIFE COMPOSITIONS, 31st Dec., 1896	370	4	0						
Do. 1897	178	10	0						
" VEITCH SPECIAL PRIZES				548	14	0			
" CHISWICK SCHOLARSHIP				30	0	0			
" GENERAL REVENUE ACCOUNT—				25	0	0			
Balance, 1st January, 1897	3,755	0	9						
Less Bad Debts... ..	2	2	3						
	£3,752	18	6						
By SUNDRY DEBTORS—									
Annual Subscriptions outstanding, estimated at							15	15	0
Garden Produce... ..							21	2	8
Advertisements... ..							94	17	9
Rates and Taxes (Chiswick) paid in advance							21	15	10
Interest on Local Loans							3	12	6
							157	3	9
" INVESTMENTS—									
2½ % Consols £2,122.8s. 9d. cost 1,892 11 3									
£2,022.8s. 9d. of this sum is held by the Society subject to the provisions of the will of the late J. Davis, Esq.)									
2½ % Consols £1,750 cost 1,768 5 0									
3 % Local Loans £500 " 557 11 0									
							4,218	7	3
" CASH AT LONDON AND COUNTY BANK—									
On Current Account							160	13	8
On Deposit Account							800	0	0
" CASH IN HAND—									
Head Office							2	11	1
Chiswick... ..							0	3	0
							963	7	9
							£5,338	18	9

We have examined the above Accounts, and find the same correct.

(Signed) HARRY TURNER,
JAMES H. VEITCH, } Auditors.
HARPER BROS., Chartered Accountants,
10 Trinity Square, E.C.

January 6, 1898.

GENERAL MEETING.

MARCH 8, 1898.

Mr. JOHN T. BENNETT-POË in the Chair.

Fellows elected (56).—Mrs. A. Adams, Fred. Ashton, Earl Beauchamp, Miss L. Bethell, Mrs. Brown, E. Burden, F. W. Campion, F. L. Carslake, D. Carson (Australia), W. H. Charman, Reginald R. Cory, Mrs. D. Davidson, Miss A. Davies, Sydney Davis, Mrs. Du Port (Egypt), E. Guy Fenwick, W. Garrod, Harry Gaskell, W. C. V. Harwood, Thomas Hayes, Mrs. A. Hill, Mrs. Rolls Hoare, Mrs. Holman, Joseph F. Johnson (New York), Cyril D'Arcy Leaver, W. H. Leslie, J. S. Manley, Miss Manisty, W. Mann, Mrs. A. Manners, Mrs. McClean, Major F. B. McCrea, Mrs. E. Mills, F. E. Morris, John B. Nickolls, Mrs. G. Norman, James Orsman, John D. Pearson, Miss Perrin, Henry S. Rivers, Miss Roberts, Mrs. Carr Saunders, Dr. G. H. Savage, A. F. Scrase-Dickins, Mrs. Shipley, T. H. Spry, W. H. Stansfield, Mrs. Streatfield, B. D. Tabor, Miss M. Tolson, Mrs. Tonkin, G. Warde, P. M. Wessel, Countess of Westmoreland, E. L. Whitby, G. A. Wigram.

Societies affiliated (2).—Farnborough Horticultural Society, Farnham Royal, East Burnham and Hedgerley Horticultural Society.

A lecture on "Some of the Plants Exhibited" was given by the Rev. Prof. Geo. Henslow, M.A., V.M.H. (*See* p. 53.)

GENERAL MEETING.

MARCH 22, 1898.

Mr. GEORGE BUNYARD, V.M.H., in the Chair.

Fellows elected (24).—Lady Heathcote Amory, Mrs. E. G. Anderson, Mrs. Arnott, Edgar S. Blaker, Peter Cardwell, Mrs. Challinor, Dr. Holland, J. Cotton, Miss Davies, Rev. A. Foster-Melliar, C. E. L. Freeling, Chas. H. Hanbury, Dr. Holman, Mrs. M. Hyde, Mrs. Johnston, Miss L. Palmer, Mrs. F. Pearse, Lady Quilter, Mrs. Salt, Rev. F. T. Simmonds, Edwin Smith, W. Thursby, H. B. Marriott Watson, Mrs. Watney, Mrs. J. W. Wilson.

A lecture on "Soils" was given by Mr. J. J. Willis. (*See* p. 65.)

SCIENTIFIC COMMITTEE.

JANUARY 11, 1898.

Mr. MICHAEL, F.L.S., in the Chair, and four members present.

Fungus on Beech.—A box of fungi was received from Lady Cave, Cleve Hall, Downend, near Bristol. They were forwarded to Kew, whence it was reported that they were *Plerotus ostreatus*, Jacq., "one of the best and safest of edible fungi." The specimens were taken from a very old Beech in the gardens of Cleve Hall. They were growing on the wood about twelve feet from the ground.

SCIENTIFIC COMMITTEE, FEBRUARY 9, 1898.

Dr. M. T. MASTERS in the Chair, and ten members present.

Evolution Committee of the Royal Society.—Mr. Bateson, one of a deputation to the Society from the Royal Society, called attention to the existence of the Evolution Committee of the Royal Society, the object of which is to promote accurate observations of facts relating to variation, heredity, selection, and other phenomena connected with the evolution of plants and animals.

Earlier in the afternoon Dr. Masters and Mr. Bateson had attended the Meeting of the Council, and having explained their wishes, and laid the following document on the Council table, had received assurance of hearty co-operation, which the Council considered could be best rendered through the medium of the Scientific Committee.

Evolution Committee of the Royal Society.—A Committee has been appointed by the Council of the Royal Society to promote accurate investigations of facts relating to variation, heredity, selection, and other phenomena connected with the evolution of plants and animals. Those who are engaged either in breeding the various races of domesticated animals, or in raising plants by cross-breeding or otherwise, have exceptionally good opportunities of making observations on the above subjects. In the course of their business attention is necessarily directed to the effects

of various systems of breeding, to crosses between different species or varieties, to the transmission of parental characters, to the origin of new varieties, the appearance of "sports," and to other facts of a similar nature. Breeders and horticulturists are, in fact, continually engaged in experiments on a large scale, many of which, if recorded in detail, would have a high scientific value. The importance of such records is now generally admitted, and has been especially exemplified by the use that Darwin made of them in his writings, particularly in "Animals and Plants under Domestication." Though publications connected with the farm and garden frequently contain notices of striking phenomena witnessed in the propagation of animals and plants, such accounts are, unfortunately, for the most part, imperfect. If the observations were more systematically made, and the facts more precisely described so as to admit of comparison, and if greater precautions were taken to exclude the possibilities of error, the records obtained would constitute a valuable body of trustworthy evidence. Those who are professionally engaged in breeding and plant-raising have, as a rule, little leisure for observing or recording their results with more detail than is necessary for their own purposes; but it is suggested that this Committee might facilitate additional work of a more strictly scientific character, in various ways appropriate to particular cases, especially by making arrangements for the maintenance of full and continuous records, and for the preservation, measurement, drawing and photographing of specimens in such a way that their essential features shall be permanently recorded. The Committee are assured that in suitable cases this could be done without interference with the directly practical side of the operations; and they are convinced that, by co-operation between breeders and horticulturists on the one side, and naturalists on the other, numerous and valuable opportunities for observation could be utilised which are now lost. To bring about such co-operation is one of the primary objects of the Committee. The manner in which it could be best effected must necessarily be the subject of special arrangement in each case.

Horticultural Sub-Committee.—A Sub-Committee has

been appointed to confer with the Royal Horticultural Society, and to further the objects of the Committee so far as horticultural investigation is concerned. It is hoped that some of those who are engaged in practical horticulture may be willing to assist the Committee by communicating the results obtained, and allowing their operations to be observed and recorded as indicated above. As a practical example of the work contemplated, it is supposed that a firm is trying to raise an improved form of some annual. Each year a batch of seedlings of known parentage is produced. For horticultural purposes it is enough that the good seedlings should be kept and the rest destroyed, and so on until the new variety is "fixed." But for scientific purposes it is desirable that the appearances of the seedlings in each crop should be put on record *before any selection is made*, and the whole history of the variety thus preserved. By measurement and photography this could often be done by competent observers without putting the grower to any extra trouble. The amount of such work which the Committee could undertake to record in detail must in the first instance be small, and only the most suitable cases can be undertaken. All information given to the Committee will be regarded as confidential, and will not be published without permission."

In order to further the above objects, it is hoped that any persons engaged in practical horticulture may be willing to assist the Committee by communicating the results obtained, and allowing their operations to be observed and recorded. The Secretary of the Scientific Committee will be glad to receive any communications.

Currant Mite.—Mr. Berry gave an interesting account of the history and progress of this destructive pest, especially to Black Currants in Kent. It was first observed some ten years ago, but has now reached alarming dimensions. Miss Ormerod recommended picking off and destroying the buds infested with the mite (*Phytoptus ribis*), the cause of the complaint. This was done, but last year a sudden development occurred, when picking became useless. The "Baldwin," a very heavy cropper, was the variety most seriously attacked. The "Red Budded Naples" were only slightly affected; but this variety is not a

heavy cropper, and, the fruit being more readily shed, it is not so useful as the Baldwin for market purposes. Mr. Berry suggested that experiments might be carried out at Chiswick to discover which was the most resisting variety, as had been done with some other plants in the Horticultural Gardens of Victoria, to aid the fruit industry of Australia.

Mr. McLachlan gave some account of the general habits of the *Phytopti*, remarking that this species was first noticed by Westwood some thirty years ago. It is nearly legless, and lives inside the bud, consequently it is very difficult to reach by means of insecticides. He could only recommend hand-picking, unless a mite-proof variety could be found, as they had raised more or less *Phylloxera*-proof vines.

Mr. Michael also contributed further details, observing that all the species of *Phytoptus* were parasites, and that while many species might attack the same plant, a single species might also live on many kinds. They were excessively minute, possessing only two pairs of legs instead of eight, and always protect themselves, so that it becomes a very difficult matter to reach them, as, *e.g.*, in the curled-up edges of leaves, and within buds. It had been found that kerosene emulsion continuously applied by spraying had been more or less effective against *P. pyri*, but *acari* are far less sensitive to chemicals than insects. The eggs especially have a dense cuticle, so as to render it quite impervious to the chemical action of insecticides. The only chance was to repeat the process of spraying, and catch the successive broods. The only thing absolutely fatal to *Acarus* life was boiling water; eggs and all were destroyed at once.

Mr. Berry, in replying, observed that the remedy hitherto suggested, of cutting down the shoots of the currant bushes attacked, was quite useless. Mr. Veitch suggested that analysis of the branches of the varieties most and least affected might reveal some differences, but Mr. Wilks expressed himself as very doubtful of any appreciable differences being discoverable even if they exist. Mr. Engleheart raised the question as to whether the Baldwin variety was weaker than others through over-propagation, but Mr. Michael added that *Phytopti* do not by any means prefer the weaker plants, but are found more usually on perfectly healthy ones.

Carnations and Caterpillars.—Mr. Douglas exhibited some

grubs received from Mr. White, Wateringbury, Kent, but the species was not readily determinable without being bred to the imago stage. It was suggested that gas-lime should be used, as for wire-worm, to destroy them.

Pines, Diseased.—Specimens of Scotch Fir and of *Abies Nordmanniana* were received from Mrs. Marshall, Skelwith Fold, Ambleside, the former attacked by the Pine-beetle, the latter by *Chermes abietis*. This insect has always proved to be very fatal to this species of *Abies*, and the only suggestion that could be made was to cut down the tree and burn all parts attacked. With regard to the Pine-beetle, to encourage the multiplication of insectivorous birds as far as possible might be advantageous.

Cypripediums with Fungus.—Mr. Douglas exhibited specimens with the roots badly infested by a Mycelium. Mr. Veitch at once recognised it as the result of a too damp atmosphere, recording the fact that having on one occasion to make a double roof, it caused so much damp that he lost many Orchids from the same cause, but on improving the atmosphere this completely prevented any recurrence of the fungus.

Primula obconica ♀ × *sinensis*.—Mr. Shea showed a hybrid raised between these species. The flowers were pink, showing the extension of yellow from the throat, with curled petals, and bearing a decided scent of *sinensis*. The calyx, however, was entirely that of *obconica*. The general appearance was nearer that of the female parent. Mr. Shea proposes to re-cross with *sinensis*, and so intensify the features of the male parent.

Two-spathed Arum.—A fine example of this very common condition was received from Mr. Thomas Bennett, The Gardens, Shavington Hall, Market Drayton.

San José Scale.—The Rev. W. Wilks said that the Council had sent a memorial upon the subject of this pest, *Aspidiotus perniciosus*, to the Department of Agriculture. Mr. McLachlan remarked that a discussion upon the subject, and its reported introduction into Great Britain, took place at a recent meeting of the Entomological Society. Mr. R. Newstead, who has devoted special attention to the Coccidæ, stated that not even an expert could with certainty identify this scale, or distinguish it from amongst the upwards of thirty described species of *Aspidiotus*, without the most careful microscopical examination. Any

attempt to identify it upon imported fruit by the unaided eye, or with the assistance of a hand-lens, would therefore prove futile. If it got into this country it was much more likely to be introduced through plants or trees than by the importation of fruit. Should it obtain a footing here there is no reason to suppose that it would be more injurious than the apple mussel scale, *Aspidiotus conchiformis*, which is, or ought to be, familiar to most apple-growers. In our climate the San José scale would probably become single-brooded, instead of, as in America, having up to as many as five generations in a year.

SCIENTIFIC COMMITTEE, MARCH 8, 1898.

DR. M. T. MASTERS in the Chair, and three members present.

Phytoptus ribis.—An interesting letter was received from Miss Ormerod, giving an account of what is being done experimentally at the Duke of Bedford's fruit farm at Woburn, under the direction of Mr. Spencer Pickering, F.R.S., as to the possibility of obtaining "mite-proof" Black Currants. The only result has been some plants received from Buda-Pest, which have been distributed to the Toddington fruit grounds, to Mr. Speir Newton's farm, Glasgow, and to Woburn. Miss Ormerod has given as exhaustive an account as she could form of the disease in a special appendix to her twenty-first annual report from the period of its first appearance until the present time. A series of experiments is now being set on foot at Woburn directed to every point which is open for serviceable action, including chemical applications. These will be followed by expert examinations of the contents of the galled buds treated; and with coincident examination of galled buds under precisely similar circumstances, but *not* treated chemically.

Scotch Fir, Malformation.—Mr. Veitch sent a curious mass of stunted boughs, the whole resembling a hedgehog, and perhaps caused originally by a *Phytoptus* or *Fungus*. Dr. Masters observed that short boughs, grafted from such specimens, might be used as miniature trees for rockwork, &c.

Sprouting Broccoli.—A remarkable specimen was received from Mr. W. P. Wright, Willesborough, Ashford, Kent, from the central and much enlarged stem of which a large number of

good-sized lateral shoots had appeared. It was suggested that if it be capable of being "fixed" it would probably prove a valuable acquisition.

Phytoptus on Hazel.—Mr. G. Gordon, V.M.H., sent specimens of this well-known gall, allied to the Currant-mite. The samples were received from Kent, where the Black Currant is badly infested.

Orchid Roots with Fungus.—With reference to the specimen brought to the last meeting, Mr. Murray, of the Gardens, Oakwood, Wylam-on-Tyne, writes to say that he is "convinced that it is from no other cause than from the lack of air, or, rather, of circulation of air, among the plants." In a previous communication to Mr. Douglas, he expressed agreement with Mr. Veitch's interpretation, but not quite in the manner he explained, for he observes, "I ventilate the houses day and night with the ventilators, . . . but the air upon the stages, or, rather, above the stages, when the plants are standing close together, travels very slowly, even with the ventilators open, in comparison with that around the centre staging, as plants thereon seldom show signs of fungus."

Two and Three Spathed Arums.—Mrs. Richards, of Westridge, near Ryde, forwarded two flowers, one with two spathes, the other with three, both from the same plant. They were very fine instances, and it was reasonable to expect such might prove constant. If so, a permanent form with two or more spathes might become fixed. [But the beauty of such a monstrosity would be very doubtful.—ED.]

Azaleodendron x.—A hybrid between an *Azalea mollis* or *sinensis* and a spotted *Rhododendron*, exhibited by Sir Trevor Lawrence, was unanimously awarded a botanical certificate. It was raised by Prof. Pynaert, of Ghent.

Large Ivy Stem.—Prof. Henslow exhibited a section of Ivy some 10 in. by 8 in. across. It grew round a tall Holly, about 50 ft. in height, at Zeals Rectory, Wilts.

Twin Apple.—A remarkable monstrosity was sent from Mr. Bar-at-Gin, 3 Praed Street. Instead of being the result of the fusion of two flowers, as occurs in Tomatos, i.e. a "synanthic" condition, a vertical section revealed the fact that they were the result of a bifurcation of the axis below, the under side of the Apple giving no signs of its being a twin.

Cypress Diseased.—A specimen received from Dr. Church, having the bark split and detached and infested with fungi, was forwarded to Kew for further examination. The following report was received: "*Cupressus dolabrata*.—This is a typical example of bark-scorching. The cortex, being first killed by exposure to the sun's rays, afterwards splits and forms sun-cracks, and finally separates from the wood. The fungus present—*Corticium lacteum*, *Fries*—is simply saprophytic on the dead parts."

SCIENTIFIC COMMITTEE, MARCH 22, 1898.

Dr. M. T. Masters in the Chair, and eight members present.

Orchid Roots with Fungus.—With reference to the nature of the fungus attacking Orchid roots in a damp atmosphere, referred to at the last meeting, Dr. W. G. Smith, of the Yorkshire College, Leeds, writes as follows:—"The Orchid aerial roots sent contained a fungus which lives on them and has killed some already. The absence of any form of reproductive organs renders it impossible to identify the parasite. Other portions of diseased plants (*i.e.* leaves) would be required to ascertain the true nature of the fungus. The fungus present attacks living cells, consumes the food laid up by the plant, and finally kills the roots. A disease having somewhat the same effects has been found in the Vanilla plants of Mauritius."

Palm Leaves Discoloured.—Mr. W. A. Holmes, of the Putney Nurseries, sent some portions of Palm leaves with numerous translucent spots. They were received from the Continent. An examination appeared to indicate a previous attack by insects; but none were present, the interior tissue having disappeared from the spots, so that the new leaves would probably be quite healthy.

Vine-Browning.—Mr. Hudson showed a young shoot, the leaves of which were blistered and brown. This is due to the presence of Myxomycetous fungus, *Plasmodiophora vitis*, allied to *P. Brassicæ*, the "slime fungus," which gives rise to "club disease," or "finger and toe," in cultivated cruciferous plants. The only remedy is to cut away and burn all affected leaves or shoots. It is described and figured in Viala's "*Maladies de la Vigne*," p. 400.

Ivy Sports.—Dr. Masters exhibited sprays of a peculiar small-leaved dwarf Ivy, remarkable for sending up vertical shoots with distichous leaves, though unattached to a wall. The habit appears to have become fixed, even in free-growing branches. On some shoots, however, the leaves were spirally arranged, as is usual on such branches. It may be observed that the change from the distichous arrangement of the leaves on the horizontal branches of the common Laurel to a spiral one, when the boughs grow erect, is common: but it is not a fixed character.

FRUIT AND VEGETABLE COMMITTEE.

JANUARY 11, 1898.

PHILIP CROWLEY, Esq., in the Chair, and seventeen members present.

Awards Recommended:—

Silver Knightian Medal.

To Mr. J. Bury, Petersham Byfleet, for a collection of Grapes.

To Mrs. Wingfield, Ampthill (gr. Mr. Empson), for 80 dishes of Apples.

First-class Certificate.

To Pear 'President Barabe' (votes, 12 for), from Mr. Allan, Gunton Park. (See vol. XXI. p. cciii.)

Cultural Commendation.

To Mr. J. Miller, Ruxley Lodge Gardens, Esher, for Mushrooms.

To Messrs. Rivers, Sawbridgeworth, for Citrons.

Other Exhibits.

Mr. J. Walker, Thame, sent an Apple, 'Chilton Beauty.' It was considered very close to 'Bess Pool,' differing only in the base and in having a greenish flesh.

Messrs. Rivers, Sawbridgeworth, sent Grapes, 'Directeur Tisseraud' and 'Mrs. Pearson,' to show how well these varieties keep.

Mr. Thomas Rochford, Turnford Hall, sent a new Grape,

'Turnford Hall.' It is a sport from 'Alicante,' but resembling 'Gros Colmar' in appearance. The same sport exactly was said to have occurred last year in a garden near Norwich. In sending it Mr. Rochford observes: "It will be noticed that the berries are half as large again and of much finer shape than 'Alicante,' whilst the colour is all that could be desired. The

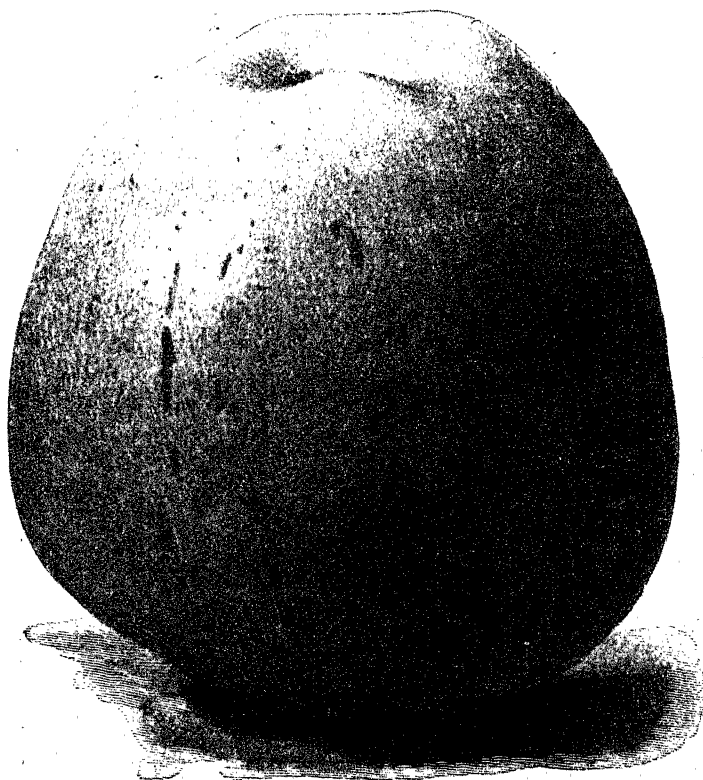


FIG. 2.—APPLE 'GOODWOOD PIPPIN.' (*Gardeners' Magazine*.)

two bunches shown were grown on a 15-ft. rod with twenty other bunches, of which fifteen are the sport and the remaining five are the true 'Alicante.' These five are on the bottom part of the rod. Last year the rod carried over twenty bunches, which remained hanging on the rod till the beginning of April, and this year the sport is now quite firm, whilst we were obliged

to cut the 'Alicante' bunches before Christmas, as they were softening fast. The wood of the sport is much shorter jointed than that of 'Alicante,' and the leaves vary sufficiently to enable you to distinguish one from the other." The berries were in shape midway between 'Alicante' and 'Gros Colmar,' and fully as large as 'Gros Colmar.' The flesh was juicy and brisk, recalling 'Alicante.' The Committee desired to see a bunch that had been grown on its own roots, to ensure the sport being fixed.

Mr. R. Parker, of Goodwood, again exhibited Apple 'Goodwood Pippin.' (Fig. 2.)

G. Ballinger, Esq., Upper Alstone, Cheltenham, sent an Apple almost if not quite identical with 'Waggener.' It is highly coloured and of very irregular shape; a good bearer and keeps late, but has a flavour of Quince.

FRUIT AND VEGETABLE COMMITTEE, FEBRUARY 8, 1898.

PHILIP CROWLEY, Esq., in the Chair, and twenty-one members present.

Awards Recommended :—

First-class Certificate.

To Apple 'Lord Hindlip' (votes, unanimous), from Mr. John Watkins, Pomona Farm, Hereford. (Fig. 3.)

To Pear 'Passe Crassanne' (votes, 13 for), from Mr. Geo. Woodward, Barham Court, Maidstone. An old variety, but seldom, if ever, seen in such fine condition as Mr. Woodward's specimens. Fruit very large, almost round, but flattened towards the eye, which is large and open and set in a rather deep depression. Stalk long, set in a very deep but small round cavity. Skin entirely covered with rough russet-red brown. Flesh melting and full of juice, and of rich flavour. It requires double grafting and the warmest, choicest spot on the wall, together with very high cultivation.

Award of Merit.

To Cucumber 'Every Day' (votes, 8 for, 6 against), from Mr. Owen Thomas, Royal Gardens, Windsor. It had been previously exhibited under the name of 'All the Year Round.'

Cultural Commendation.

To Mr. J. Clarke (gr. to G.W. Keen, Esq., Mill Lodge, Barnes), for a fine basket of Mushrooms.

Other Exhibits.

Messrs. Geo. Bunyard sent Apples 'Bedfordshire Foundling' to compare with Mr. Parker's 'Goodwood Pippin.' (Fig. 2.)

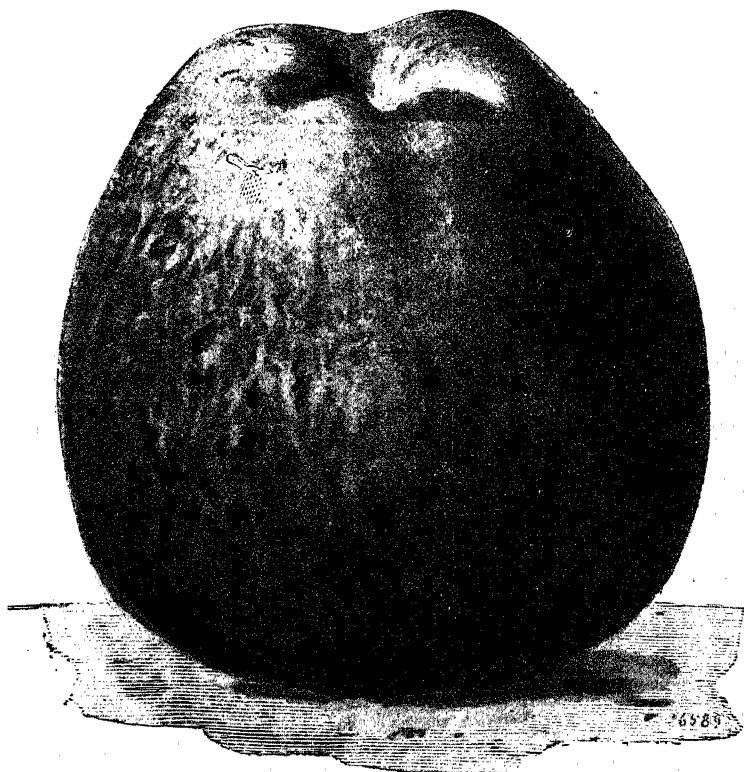


FIG. 3.—APPLE 'LORD HINDLIP.' (*Gardeners' Magazine.*)

The two Apples were seen to be very nearly alike, but evidently distinct, the 'Goodwood Pippin' being by far the better keeper.

Mr. J. A. Prall, of Matfield, sent Apple 'Striped Wellington,' being a sport from 'Dumelow's Seedling.' The fruits were very handsome, and, like its progenitor, very crisp and acid, and a magnificent cooker. Mr. Prall considers it to be of much better

constitution than 'Dumelow's,' and if this should by experience prove to be the case, it will no doubt in time supplant its parent. The brilliant scarlet and yellow stripes of colour, though adding greatly to its beauty, do not, of course, add to its cooking qualities.

Mrs. Wingfield (gr. Mr. Empson), Amptill House, sent a beautiful dish of 'Chiswick Red' Tomatos.

Lord Suffield (gr. Mr. Allan), Gunton Park, sent a new Pear named 'Blickling,' after the locality in which it was believed to have originated. The fruits were very sweet and juicy and excellent for the time of year, but in outward appearance very like 'Josephine de Malines,' only without its distinctive flesh and flavour.

Lord Foley (gr. Mr. Miller), Ruxley Lodge, sent a collection of Apples, Pears, and Mushrooms.

Mr. George Mount, Canterbury, brought a collection of Apples.

Messrs. Sutton, of Reading, sent Broccoli and Peas in excellent condition.

FRUIT AND VEGETABLE COMMITTEE, MARCH 8, 1898.

T. FRANCIS RIVERS, Esq., V.M.H., in the Chair, and twenty members present.

Awards Recommended:—

Silver Banksian Medal.

To Mrs. Wingfield (gr. Mr. Empson), Amptill, for 20 dishes of Apples.

Bronze Banksian Medal.

To C. P. Serocold, Esq. (gr. Mr. Bullock), Taplow Hill, for 8 dishes of Apples.

First-class Certificate.

To Cucumber 'Every Day' (votes, 10 for), from Her Majesty's Gardens, Windsor (gr. Mr. Owen Thomas, V.M.H.). The fruits shown were superb, and they had been cut from plants of which the seed was sown only since Christmas. (See page xxvi.)

Cultural Commendation.

To Mr. Wythes (gr. to Earl Percy, Syon), for two bundles of

Asparagus from beds in the open ground, forced only by a simple covering of leaves. It looked excellent.

Other Exhibits.

Mr. Empson brought an Apple 'Empson's Favourite,' with specimens of the cooked fruit. It was said to be a seedling from 'Beauty of Kent,' and from its somewhat rough appearance appeared to have been crossed with 'Cat's Head.' It was not considered to be equal to 'Newton Wonder,' 'Lane's Prince Albert,' 'Dumelow's Seedling,' &c.

Colonel Evan Thomas, Frogmore, Ross, sent a very fine dish of Apple 'Bess Pool.' It is an excellent Apple, and keeps splendidly, but the trees are a very long while coming into bearing, and generally not reliable croppers.

Messrs. Lane, Beckhamsted, sent a grand basket of Apple 'Lane's Prince Albert,' also a new variety 'St. John's Seedling,' not very unlike 'Winter Peach' in appearance. It is a cross between 'Lane's Prince Albert' and 'King of the Pippins.'

Mr. Wythes brought from Syon dishes of three very distinct-looking Jerusalem Artichokes, which were very interesting:— (1) 'Sutton's White,' an almost round variety. (2) 'Vilmorin's White,' similar to Sutton's, *i.e.*, of the same thickness, but quite twice the length. (3) 'Syon Long White,' of which the tubers had lengthened themselves, partly at the expense of their thickness, to almost, if not quite, a foot in length, and looked like very enormous sticks of Argenteuil Asparagus. Mr. Wythes was requested to send a few tubers of each variety to Chiswick for trial.

Mr. John Wall, Tenbury, sent Apple 'Ancient Briton.'

Mr. Geo. Abbey, Avery Hill, Eltham, sent a new Hoe, which was referred to Chiswick for trial.

Messrs. James Veitch, Chelsea, sent a very fine assortment of variegated Kales.

FRUIT AND VEGETABLE COMMITTEE, MARCH 22, 1898.

GEO. BUNYARD, Esq., V.M.H., in the Chair, and twenty members present.

Awards Recommended:—

Cultural Commendation.

To Mr. Geo. Wythes (gr. to Earl Percy, Syon House), for forced Strawberries 'Royal Sovereign.'

Other Exhibits.

Mr. S. W. Shailer, Avenue Road, Brentford, exhibited a patent Cultivator, which was said to be greatly superior in its action to ordinary Dutch hoeing. It was constructed on the same principle for hand use as a farm scarifier for horse draught. It was referred to Chiswick for trial.

FLORAL COMMITTEE.

JANUARY 11, 1898.

W. MARSHALL, Esq., in the Chair, and eighteen members present.

Awards Recommended:—

Silver Flora Medal.

To Messrs. Sutton, Reading, for Cyclamen, many of them having semi-double flowers and some with fringed edges. (Figs. 4, 5.)

To Mr. Box, Croydon, for Primulas.

To Messrs. Laing, Forest Hill, for flowering and foliage plants.

To Messrs. Cannell, Swanley, for Primulas.

Silver Banksian Medal.

To Messrs. Low, Enfield, for Cyclamen and Carnations.

Other Exhibits.

F. W. Moore, Esq., Botanic Garden, Glasnevin, sent beautiful flowering sprays of the Winter-sweet (*Chimonanthus fragrans*).

Mrs. Wingfield, Ampthill House (gr. Mr. Empson), sent a Maranta, which the Committee asked to see again.

Messrs. Jas. Veitch, Chelsea, sent a collection of hardy shrubs and greenhouse Rhododendrons.

FLORAL COMMITTEE, FEBRUARY 8, 1898.

W. MARSHALL, Esq., in the Chair, and twenty-eight members present.

Awards Recommended:—

Silver Gilt Flora Medal.

To Messrs. W. Paul, Waltham Cross, for Camellias.

Silver Gilt Banksian Medal.

To Messrs. Hill, Lower Edmonton, for Ferns.

Silver Flora Medal.

To Messrs. Jas. Veitch, Chelsea, for Primulas and Hardy Shrubs.

To Messrs. Cannell, Swanley, for Primulas.

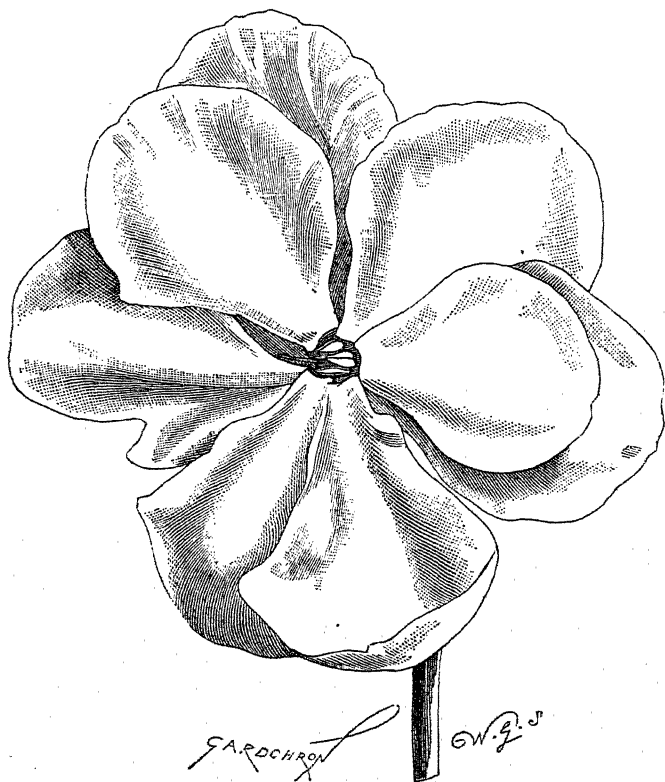


FIG. 4.—SEMI-DOUBLE CYCLAMEN. (*Gardeners' Chronicle.*)

Silver Banksian Medal.

To the Hon. H. C. Legge, Fulmer, Slough (gr. Mr. Mowbray), for Freesias.

To Mr. Mount, Canterbury, for Roses.

Bronze Banksian Medal.

To Messrs. Peed, West Norwood, for flowering and foliage plants.

First-class Certificate.

To *Anthurium Andreanum* 'Dr. Lawrence' (votes, unanimous), from Sir Trevor Lawrence, Bart., Burford (gr. Mr. Bain).



FIG. 5.—SEMI-DOUBLE CYCLAMEN WITH FRINGED EDGES. (*Gardeners' Chronicle*.)

This is a distinct and handsome variety with enormous salmon-pink spathes. The finest of its class.

Other Exhibits.

Sir Trevor Lawrence also sent a white flowering form of

Heuchera sanguinea and blossoms of *Helleborus* 'Stephen Olbritch.'

S. G. Lutwyche, Esq., Eden Park, Beckenham (gr. Mr. Paterson), sent a well-blossomed plant of *Iris Chinensis*.

From Her Grace the Duchess of Cleveland, Battle Abbey, (gr. Mr. Camm), came long sprays of *Bougainvillea spectabilis* wreathed with showy flowers, also splendid specimens of *Bignonia venusta* with terminal trusses of orange flowers.

Rev. W. Shirley, Southwick, Fareham (gr. Mr. Berry), showed a new *Crinum* named *C. Yemense*. The plant had two stout scapes with numerous white drooping flowers. It was not considered superior to *Crinum Powellii album*.

Mrs. Thackwell, Rostellan Castle, Cork (gr. Mr. Sheppard), sent a bunch of Californian Violets, which were considered inferior to others already in cultivation.

Mrs. Wingfield, Amptill House (gr. Mr. Empson), showed *Maranta Wingfieldiana*.

From Mrs. Champernowne, Totnes, came a flowering plant of a new American Violet named 'Mrs. J. J. Astor.' It was stated that the plants had been in bloom in a cold frame since the early part of November, and were considered to be freer in bloom and better in growth than *V. 'Madame Millet.'*

Lady Elphinstone, Heawood Hall, Chelford, sent a new and very beautiful double Snowdrop.

Messrs. Cuthbert, Southgate, exhibited Crocuses, Hyacinths, and Scillas.

From Mr. Russell, Richmond, came a collection of *Euonymus* and three baskets of *Daphne mezereum* varieties.

Messrs. Paul & Son, Cheshunt, sent a group of hardy flowers.

Messrs. Barr, Covent Garden, sent a small collection of spring flowering bulbs.

From Mr. Ware, Tottenham, came a group of forced bulbs and spring flowers.

Messrs. R. Veitch, Exeter, sent flowers of the rare *Magnolia Campbelli*, cut from plants growing in the open air.

Mr. George, Putney, exhibited Lawton's Patent Clip for suspending flower pots.

FLORAL COMMITTEE, MARCH 8, 1898.

W. MARSHALL, Esq., in the Chair, and thirty members present.

Awards Recommended:—

Silver Gilt Flora Medal.

To Messrs. Hill, Edmonton, for Ferns.

To Messrs. W. Paul, Waltham Cross, for Camellias.

Silver Flora Medal.

To Mr. Mount, Canterbury, for Roses.

To Mr. J. May, Twickenham, for Cyclamen.

Silver Banksian Medal.

To Purnell Purnell, Esq., Woodlands, Streatham Hill, for Narcissi and Alpines.

To Messrs. Cuthbert, Southgate, for hardy Azaleas.

To Messrs. J. Veitch, Chelsea, for hardy shrubs.

To the St. George's Nursery Co., Hanwell, for Cyclamen.

To Mr. H. B. May, Edmonton, for Clematis.

Bronze Flora Medal.

To Mr. Bowles, Hanwell, for Cyclamen.

To Messrs. Laing, Forest Hill, for a group of plants.

Award of Merit.

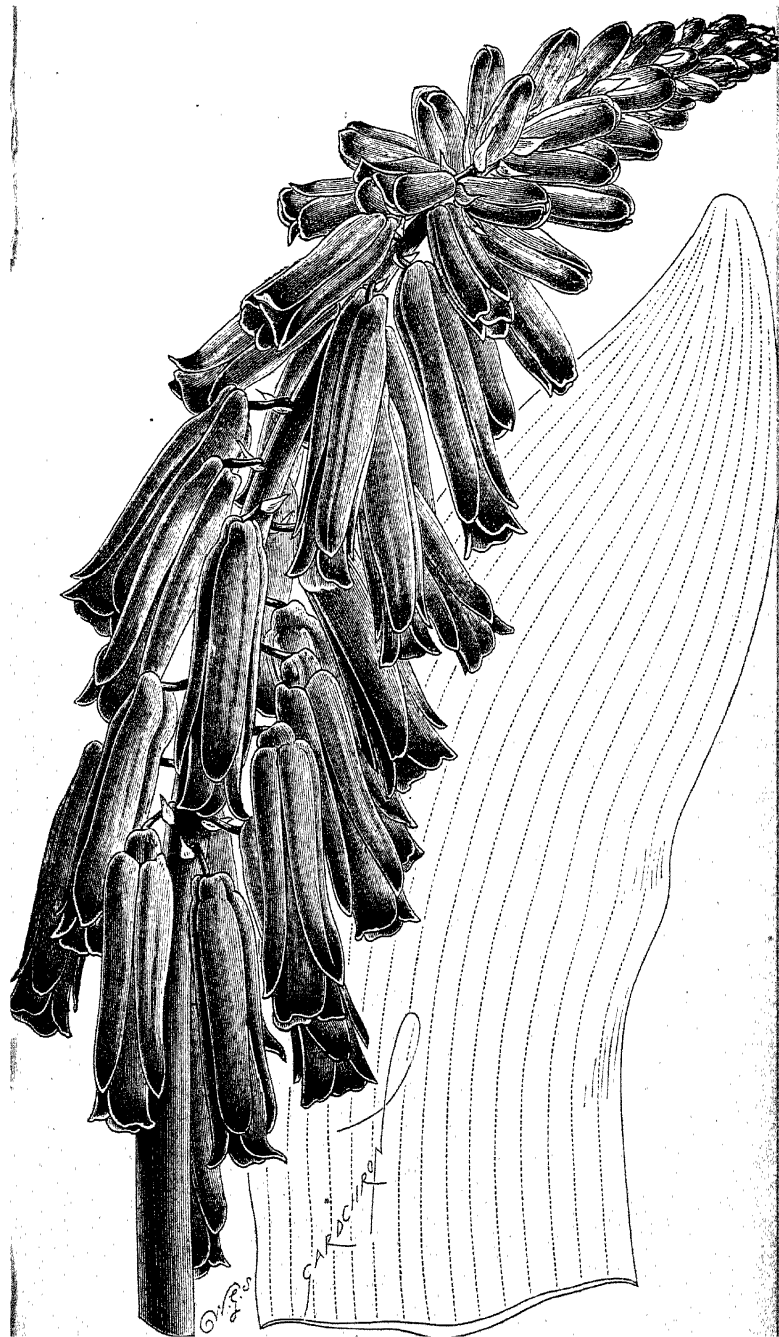
To *Hippeastrum* 'Princess Osra' (votes, unanimous), from Captain Holford, Tetbury (gr. Mr. Chapman). Very handsome crimson-scarlet flowers, with a broad band of white down the centre of each segment.

To *Hippeastrum* 'Navala' (votes, 11 for, 7 against), from Messrs. Jas. Veitch, Chelsea. Large bright red flowers of good form and substance.

To *Azalea grandiflora alba* (votes, 20 for), from St. George's Nursery Co., Hanwell. A very fine variety. Flowers large, white, the upper petals blotched and shaded with soft yellow.

Botanical Certificate.

To *Bryophyllum calycinum* (votes, unanimous), from W. Neild, Esq., Horticultural College, Holmes Chapel. This is a very interesting South American member of the order Crassulaceæ with thick fleshy ovate leaves, bronze green in the centre, paler towards the margins. Its tubular-shaped drooping



brownish flowers, streaked with yellowish green, are borne very freely in large terminal panicles. It reproduces itself by means of buds on the margins of the leaves.

Cultural Commendation.

To Mr. Cragg, gr. to Walter Walker, Esq., Percy Lodge, Winchmore Hill, for *Hippeastrum* 'Walker's Crimson.'

Other Exhibits.

Sir Trevor Lawrence, Bart., Burford (gr. Mr. Bain), sent two varieties of *Azaleodendron*, the result of crossing a *Rhododendron* with *Azalea mollis*.

W. Nicholson, Esq., Basing Park, Alton (gr. Mr. Smythe), sent *Azaleas*.

Mr. C. G. Van Tubergen, jun., Haarlem, sent specimens of *Galanthus Fosteri*, *Lachenalia pendula* and *L. p. Aureliana*. The rich crimson flowers of the last-named are very attractive and are borne with great freedom on stout spikes. A great improvement on the ordinary form. (Fig. 6.)

Messrs. Cripps, Tunbridge Wells, sent a small group of *Deutzia parviflora*.

Mrs. Newall, Ferndene, Gateshead, sent a very large truss of the rare and beautiful *Rhododendron argenteum*.

Mr. L. P. De Laughe-Vervaine, Brussels, brought a group of *Cyclamen papilio*—varieties conspicuous for their large frilled and crested variously coloured flowers. (Fig. 7.) The strain received an award of merit January 12, 1897.

Messrs. Peed, West Norwood, sent a group of mixed plants.

From Messrs. Balchin, Hassocks, came well-flowered specimens of *Boronias* and *Tetralitheas*.

Mr. C. Turner, Slough, sent a group of *Cyclamen*.

Mr. Ware, Tottenham, sent a collection of hardy plants.

Messrs. Cutbush, Highgate, sent flowering and foliage plants.

Messrs. Barr, Covent Garden, sent a collection of spring flowering bulbs.

FLORAL COMMITTEE, MARCH 22, 1898.

W. MARSHALL, Esq., in the Chair, and thirty members present.

Awards Recommended :—

Silver Gilt Flora Medal.

To Captain Holford, Westonbirt, Tetbury (gr. Mr. Chapman),
for a superb collection of Amaryllis.

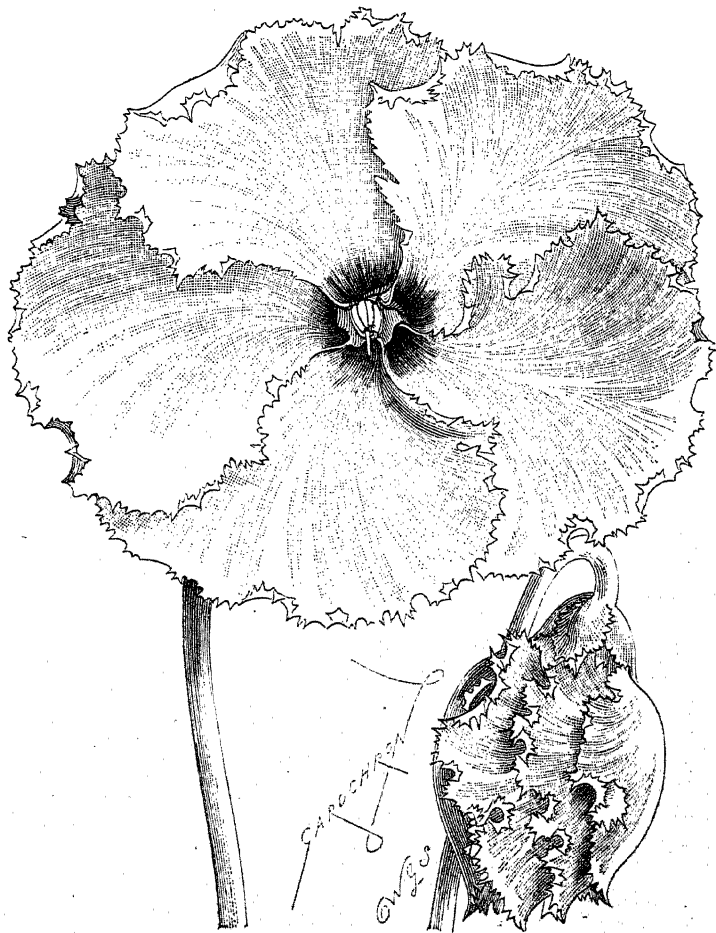


FIG. 7.—CYCLAMEN LATIFOLIUM (PERSICUM), VAR. 'PAPILIO.' (*Gardeners' Chronicle.*)

To Messrs. W. Paul, Waltham Cross, for Hyacinths and Roses.

To St. George's Nursery Company, Hanwell, for Cyclamen.

To Messrs. James, Farnham Royal, for Cinerarias.

To Mr. Mount, Canterbury, for Roses.

Silver Flora Medal.

To Messrs. Jas. Veitch, Chelsea, for Clivias.

To Mr. Rumsey, Waltham Cross, for Roses.

To Mr. H. B. May, Edmonton, for Clematis.

Silver Banksian Medal.

To Messrs. Hill, Edmonton, for Ferns.

To Messrs. Laing, Forest Hill, for flowering and foliage Plants.

Award of Merit.

To *Hippeastrum* 'Beacon' (votes, unanimous), from Captain Holford, Westonbirt (gr. Mr. Chapman), medium-sized flowers of excellent shape and substance, rich crimson, shaded with maroon in the throat.

To *Azalea obtusa* (votes, unanimous), from W. Nicholson, Esq., Basing Park, Alton (gr. Mr. Smythe). Plant of bushy habit, resembling *A. amœna*. Though small, its clear orange-scarlet flowers are borne with great freedom. It is well adapted for early forcing.

To *Hippeastrum* 'Clonia' (votes, 16 for, 5 against), from Messrs. Jas. Veitch. Flowers large and handsome, white, suffused with green, feathered and margined with rose-pink.

To *Hippeastrum* 'Tacola' (votes, 13 for, 1 against), from Messrs. Jas. Veitch. Large orange-red flowers, each segment having a broad white band down the centre. A distinct variety.

To *Hippeastrum* 'Ideala' (votes, 20 for, 4 against), from Messrs. Jas. Veitch. Flowers large and of great substance, white ground marked and shaded with glowing crimson and orange-scarlet.

To *Clivia* 'Favourite' (votes, 21 for), from Messrs. Jas. Veitch. The pale salmon-yellow flowers, touched with soft yellow in the throat, are borne in immense trusses.

To *Clivia* 'Opitima' (votes, 16 for, 8 against), from Messrs. Jas. Veitch. A handsome variety, with large, well-formed trusses of rich orange-yellow flowers.

To *Dracæna* 'Exquisite' (votes, unanimous), from Messrs. Jas. Veitch. The plant is of sturdy habit, with arching leaves 3 in. across and 16 in. long; bronze-green, deeply margined with creamy white in a young state, which gradually changes to rose-pink with age.

To *Hyacinth* 'City of Haarlem' (votes, unanimous), from Messrs. W. Paul. This variety produces massive spikes of large single primrose-yellow flowers.

Other Exhibits.

Sir C. R. Boughton, Bart., Downton Hall (gr. Mr. Bellis), sent four new *Dracænas*.

J. Watts, Esq., Hamilton House, Newmarket, sent plants of a new variegated Wall-flower named 'John Watts.'

Col. Halford Thompson, Eastcliff, Teignmouth, sent a small group of plants grown in Jadoo fibre.

Mr. Sydenham, Birmingham, sent some Wire Clips for securing Carnations and other flowers to stakes instead of tying them with matting.

Messrs. Williams, Holloway, sent *Rhododendrons* and *Clivias*.

From Messrs. Paul & Son, Cheshunt, came a group of hardy flowers.

Mr. Box, Croydon, sent *Cinerarias*.

Messrs. Cuthbert, Southgate, showed a collection of Tulips.

Messrs. Cutbush, Highgate, sent a group of foliage and flowering plants.

ORCHID COMMITTEE.

JANUARY 11, 1898.

HARRY J. VEITCH, Esq., in the Chair, and eleven members present.

Awards Recommended:—

Silver Banksian Medal.

To Captain Holford, Westonbirt, Glos. (gr. Mr. A. Chapman), for a fine stand of over fifty varieties of *Cypripediums*, including *C. × Statterianum*, several very fine *C. × Leea-num*, *C. × Sallierii Hyeanum*, &c. Several flowers of most of the varieties were shown, and with them were fine sprays of *Lælia autumnalis*.

Award of Merit.

To *Lælia anceps* Amesiana, 'Crawshay's var.' (votes, unanimous), from De B. Crawshay, Esq., Sevenoaks (gr. Mr. S.



FIG. 8.—*LÆLIA ANCEPS AMESIANA*, CRAWSHAY'S VAR.
(*Journal of Horticulture*.)

Cooke). It differs from the original variety in having larger flowers, and in the dark claret-purple of the front lobe of the lip appearing also on the side lobes. (Fig. 8.)

To *Cattleya labiata* Trianaei Sanderæ (votes, unanimous), from Messrs. F. Sander, St. Albans. Flowers large, sepals and petals white, slightly tinged with lilac. Front of the lip dark crimson-purple. (Fig. 9.)

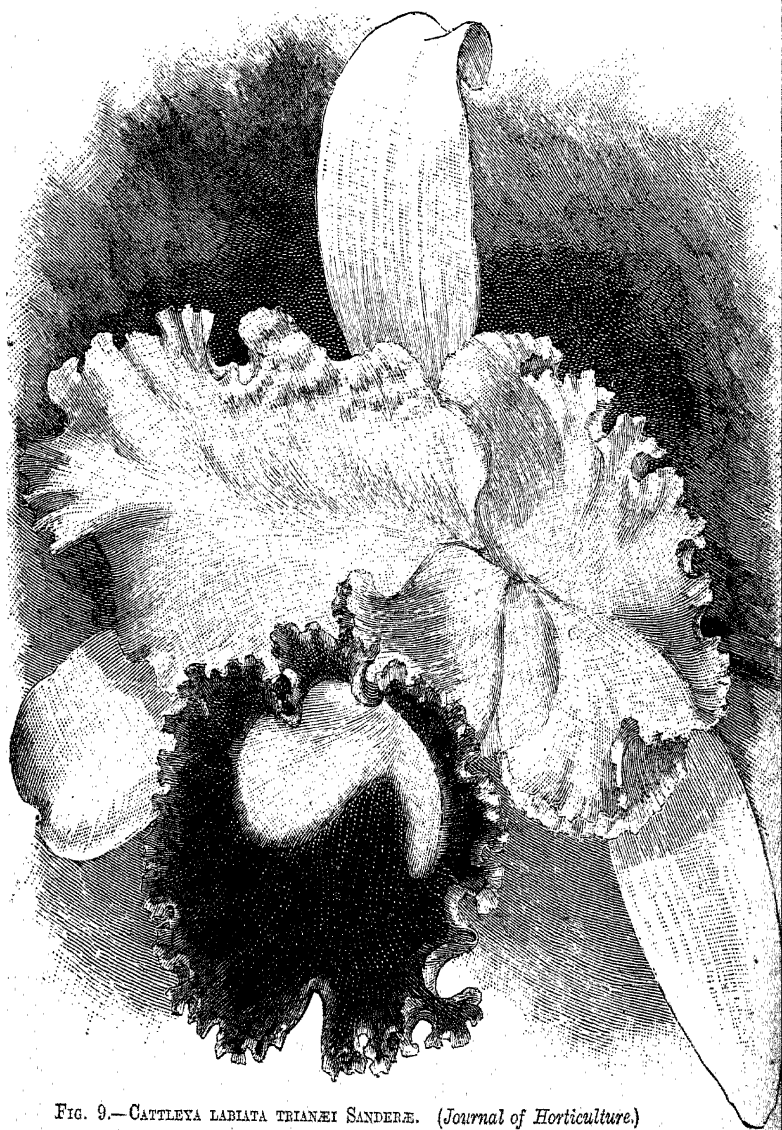


FIG. 9.—*CATTLEYA LABIATA TRIANAËI* SANDERÆ. (*Journal of Horticulture*.)

To *Cypripedium* × 'F. S. Roberts' (niveum × ?) (votes, unanimous), from Messrs. Hugh Low, Clapton. A pretty hybrid

of the same general appearance as *C. × Aylingii*, but with broader petals and larger lip. Parentage unrecorded. (Fig. 10.)

Other Exhibits.

Messrs. F. Sander had a group in which were *Lælia anceps atrorubens*, *L. a. stella*, *L. a. Sanderiana*, *L. a. Dawsoni*, hybrid *Cypripediums*, *Lycaste Skinnerii*, &c.

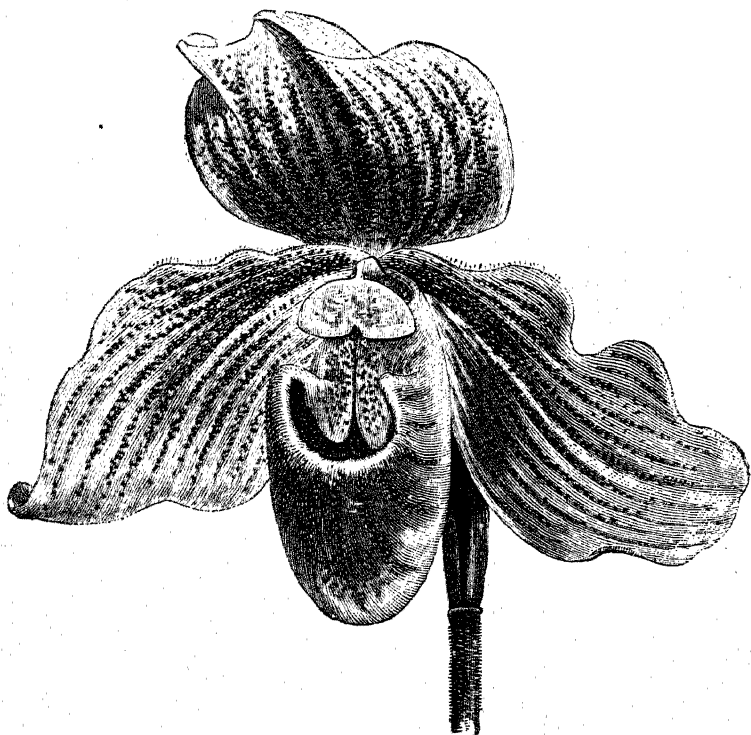


FIG. 10.—*CYPRIPEDIUM* 'F. S. ROBERTS.' (*Journal of Horticulture*.)

Messrs. Hugh Low sent varieties of *Odontoglossum crispum*, *O. Wilckeanum*, *O. Andersonianum*, and hybrid *Cypripediums*.

Frau Ida Brandt, Riesbach, Zurich (gr. Mr. Schlecht), sent *Aerides Vandarum*, grown and flowered well in a cool house, and varieties of *Lælia autumnalis*.

Fred. Hardy, Esq., Tyntesfield (gr. Mr. T. Stafford), sent a plant of *Cypripedium insigne Sanderæ*, about which doubts had been expressed. The Committee decided that it was the true

variety. He also showed *Cypripedium* × 'Calypso' and *Odontoglossum Andersonianum*.

F. W. Moore, Esq., Royal Botanic Gardens, Glasnevin, showed flowers of *Masdevallia Schröderiana*.

F. A. Rehder, Esq., Gipsy Hill (gr. Mr. Norris), showed *Cypripedium* × *Rehderianum* (*Savageanum superbum* × *purpuratum*).

C. L. N. Ingram, Esq., Elstead House, Godalming (gr. Mr. Bond), showed as *Cypripedium* × 'Magnet,' a cross between *C. insigne Chantinii* and *C. Boxallii*, and consequently of the class originally named *C. × Schlesingerianum*.

Isaac Carr, Esq., Poolemeade, Twerton-on-Avon, showed three hybrid *Cypripediums*.

The Committee inspected the coloured drawings of the Certificated plants of the past year, expressed approval, and decided to continue them with the same artist for another year.

ORCHID COMMITTEE, FEBRUARY 8, 1898.

HARRY J. VEITCH, Esq., in the Chair, and sixteen members present.

Awards Recommended :—

Silver Gilt Banksian Medal.

To Sir Trevor Lawrence, Bart. (gr. Mr. W. H. White), for a group of Orchids, most of which had been cultivated by him for over twenty years. Among them were a large specimen of *Sophranitis grandiflora* with forty-four flowers; *Angræcum pertusum* with twenty-five spikes; *Brasso-Cattleya* × *Lindleyana* with twenty-four flowers; and others similarly remarkable.

Bronze Banksian Medal.

To the Right Hon. Lord Foley, Esher (gr. Mr. Miller), for a group of *Cypripedium insigne*.

To Messrs. Hugh Low, Clapton, for a group of Orchids.

First-class Certificate.

To *Lælia anceps Waddonensis* (votes, unanimous), from Philip Crowley, Esq., Waddon House, Croydon (gr. Mr. Harris). A very fine white form of the *L. a. Schröderiana* class, but with larger flowers, and with the purple lines on the side lobes of the labellum much lighter in colour. (Fig. 11.)

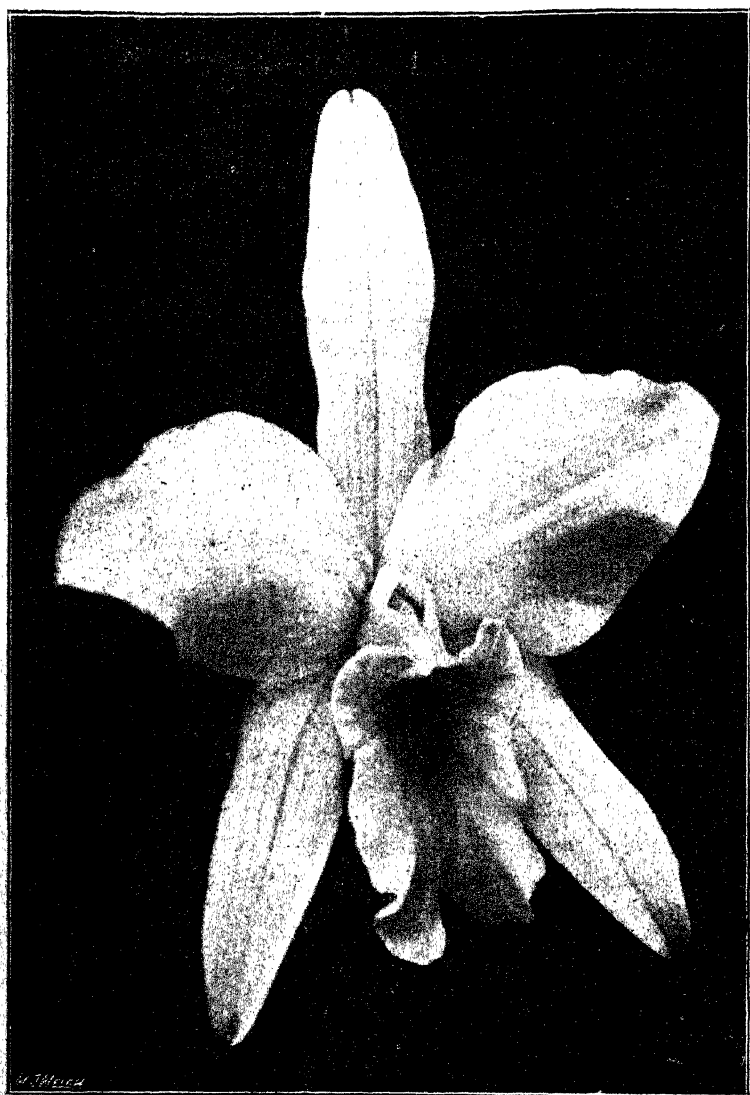


FIG. 11.—*LÆLIA ANCEPS WADDONENSIS*. (*Gardeners' Chronicle*.)

Award of Merit.

To *Phaiio-Calanthe* \times *grandis*. (*Phaius grandifolius* \times *Calanthe* \times *Bryan*) (votes, unanimous), from Norman C. Cookson, Esq., Wylam-on-Tyne (gr. Mr. Wm. Murray). This is the best *Phaiio-Calanthe* which has yet appeared. The plant bore a stout spike of large flowers, white in colour, with a rose flush at the base of the sepals and petals, and claret-purple face to the labellum.

To *Calanthe* \times *splendens* (*rosea* \times *Bryan*) (votes, unanimous), from Norman C. Cookson, Esq. (gr. Mr. Wm. Murray). Flowers of a bright carmine-crimson, darker at the base of the lip.

Other Exhibits.

Sir Trevor Lawrence, Bart. (gr. Mr. W. H. White), showed large plants of *Odontoglossums* in flower which had been grown at Burford for many years. Also hybrid Orchids raised at Burford.

Sir Frederick Wigan, Bart., East Sheen (gr. Mr. W. H. Young), showed the true *Lælia pumila præstans* and *Odontoglossum Schillerianum*.

Baron Schröder (gr. Mr. H. Ballantine) showed *Cypripedium* \times 'Antigone' in fine form.

W. Thompson, Esq., Walton Grange, Stone, Staffs. (gr. Mr. W. Stevens), showed *Odontoglossum* \times *excellens spectabile* and *O. hystrix grandis*.

Messrs. B. S. Williams, Holloway, staged a group of *Cypripediums*, &c.

Norman C. Cookson, Esq. (gr. Mr. Wm. Murray), showed *Lælio-Cattleya* \times 'Doris,' *Cypripedium* \times *Sanderi superbiens*, *C.* \times 'Ceres,' and other *Cypripediums*.

F. W. Moore, Esq., Glasnevin, sent *Maxillaria Augusta-Victoriæ Lehm*, a close ally of *M. Lindenii* cogn.

Mr. C. W. Chard, Clapton, showed *Cypripedium* \times *Chapmanii*.

Messrs. F. Sander, St. Albans, sent a fine form of *Cattleya Trianaei*, the pure white *Calanthe rubens alba*, *Lycaste Skinnerii alba*, &c.

Major Joicey, Sunningdale Park (gr. Mr. F. J. Thorne), sent a fine specimen of *Lycaste Skinnerii*.

De B. Crawshay, Esq., Sevenoaks (gr. Mr. S. Cooke), showed *Odontoglossum Rossi* *rubescens*, Rosefield variety.

Mr. Thos. Duck, Abbey Wood, showed a curious *Cypripedium* said to have been imported with *C. insigne*.



FIG. 12.—*ODONTOGLOSSUM CRISPUM* 'BARONESS SCHRÖDER. (*Gardeners' Chronicle*.)

Mrs. Wingfield, Ampthill (gr. Mr. Empson), showed *Dendrobium nobile*, Wingfield's variety.

Mr. Wm. Murray, Wylam-on-Tyne, showed his newly-invented Plant Elevators.

ORCHID COMMITTEE, MARCH 8, 1898.

HARRY J. VEITCH, Esq., in the Chair, and twenty-two members present.

Awards Recommended :—

Gold Medal.

To Baron Sir H. Schröder, The Dell, Staines (gr. Mr. H. Ballantine), for *Odontoglossum crispum*, 'Baroness Schröder,'



FIG. 13.—*PHALENOPSIS* × *J. SEDEN*. (*Gardeners' Chronicle*.)

the highest example of coloured *O. crispum* known, the flowers being of a rich claret crimson with a few white markings. (Fig. 12.)

Silver Banksian Medal.

To Messrs. Jas. Veitch, Chelsea, for a fine group of Orchids, in which many hybrids, together with their parents, were shown, and amongst others *Phalenopsis* × 'John Seden,' *P. Luddemania* × *P. amabilis*. (Fig. 13.)

Bronze Banksian Medal.

To Messrs. Charlesworth, Bradford, for a group of about thirty plants of the new *Phaius* × 'Norman' (*Sanderianus* × *tuberculosis*), and its varieties, together with *Odontoglossum*, &c.

First-class Certificate.

To *Phaius* × 'Norman' (*Sanderianus* × *tuberculosis*) (votes, unanimous), from Messrs. Charlesworth. A grand hybrid, superior to *P.* × *Cooksonii*, having larger flowers, of a clear red-

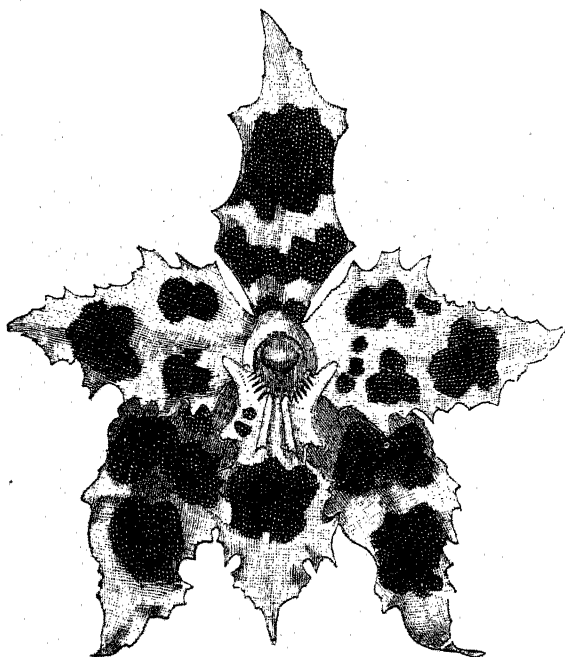


FIG. 14.—*ODONTOGLOSSUM* × *WILCKEANUM* PITTII. (*Journal of Horticulture*.)

dish-rose tint, the very large lip rose and dark purple, with golden veining.

To *Phaius* × 'Norman' *roseus* (votes, unanimous), from Messrs. Charlesworth. Flowers similar to those of the type, but of a warm rose colour on the sepals and petals.

To *Odontoglossum* × *Wilckeanum* Pittii (votes, unanimous), from H. T. Pitt, Esq., Rosslyn, Stamford Hill (gr. Mr. Aldous).

A very large yellow variety with chestnut-red blotches. (Fig. 14.)
A near ally of that shown by Baron Schröder as 'Queen Empress.'

Award of Merit.

To *Dendrobium* \times *Ainsworthii*, Woodhatch var. (votes, unani-

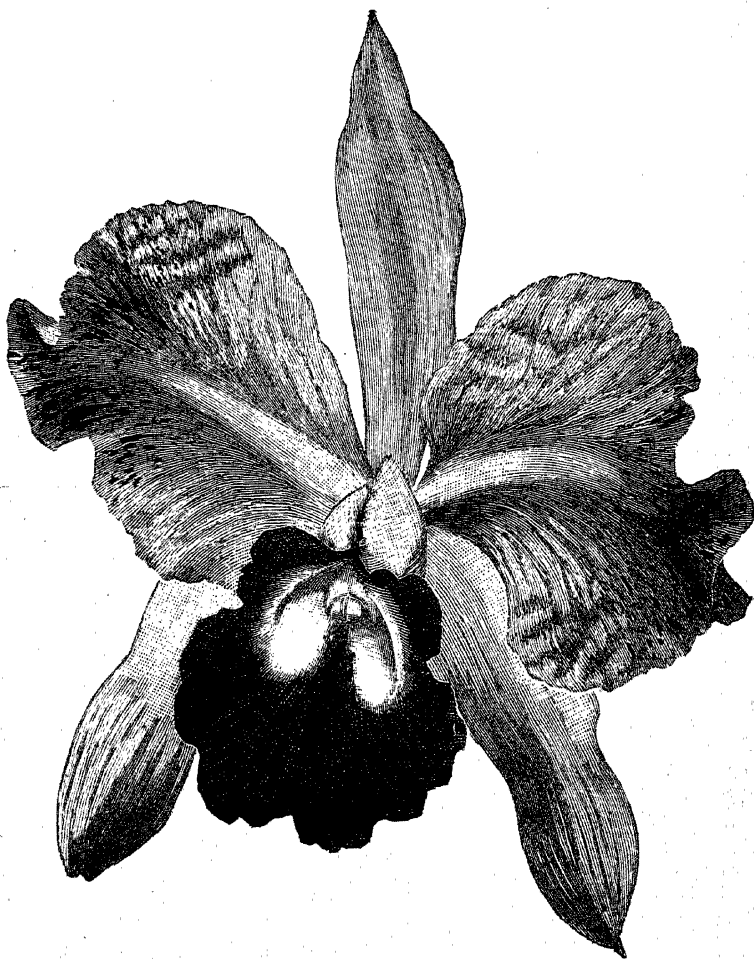


FIG. 15.—*CATTELEYA* \times 'MIRANDA.' (*Journal of Horticulture*.)

mous), from T. B. Haywood, Esq., Woodhatch, Reigate (gr. Mr. C. J. Salter). A very large cream-white form with purple disc to the lip.

To *Dendrobium* × 'Astrea' superbum (*crassinde* × *luteolum*) (votes, unanimous), from Norman C. Cookson, Esq., Oakwood, Wylam (gr. Mr. Wm. Murray). A fine hybrid with large flowers tipped with rose-crimson.

To *Phaius* × 'Norman' aureus (votes, unanimous), from Messrs. Charlesworth. Similar in form and size to the type, but with yellow sepals and petals tinged with salmon-rose.

To *Laelio-Cattleya* × *Warnhamensis* (votes, unanimous), from C. J. Lucas, Esq., Warnham Court, Horsham (gr. Mr. Duncan). Of unrecorded parentage. Probably *Laelia cinnabarina* ×. Flowers orange, heavily tinged with reddish-purple. Somewhat resembling *L.-C.* × 'Hippolyta.'

To *Odontoglossum nebulosum pardinium splendens* (votes, unanimous), from Messrs. Hugh Low, Clapton. Flowers large and handsomely spotted with olive-green.

To *Cattleya* × 'Miranda' (*Trianaei* × *Amethystoglossa*) (votes, unanimous), from Messrs. Jas. Veitch, Chelsea. Flowers of the form of *L.-C.* × *elegans*, but more ample. In colour, bright rose with purple markings on the petals, and rich crimson-purple front to the lip. (Fig. 15.)

Cultural Commendation.

To Mr. H. Ballantine, gr. to Baron Sir H. Schröder, for grand examples of three varieties of *Calanthe* × 'Baron Schröder,' *Odontoglossum coronarium brevifolium*, *O. luteo-purpureum Amesianum*, *O. Pescatorei melanocentrum*, &c.

To Mr. T. W. Bond, gr. to C. L. N. Ingram, Esq., Elstead House, Godalming, for a group of finely-flowered *Dendrobium splendidissimum grandiflorum*.

Botanical Certificate.

To Mr. Otto Froebel, Zurich, for *Spiranthes colorata*, var. *maculata*.

Other Exhibits.

Mr. E. Zollinger-Jenny, Zurich, sent *Odontoglossum ramosissimum superbum*.

Sir Trevor Lawrence, Bart. (gr. Mr. W. H. White), sent *Dendrobium* × 'Clio' and *D.* × 'Euterpe.'

Norman C. Cookson, Esq. (gr. Mr. Wm. Murray), showed

Dendrobium × 'Cybele,' Oakwood var. (*Findlayanum* × *nobile* *Burfordiense*), in which the lower sepals were decorated with purple lines on white ground as in *D. n. Burfordiense*.

Elijah Ashworth, Esq., Harefield Hall, Wilmslow (gr. Mr. Holbrook), showed *Cattleya Trianæi* *Ashworthii*, a beautiful flower of a delicate peach-blossom tint, with light rose-purple front to the lip.

Messrs. Hugh Low showed *C. Trianæi* 'Venus.'

R. I. Measures, Esq., Camberwell (gr. Mr. H. J. Chapman), showed the singular *Pleurothallis punctulata*.

W. S. Ellis, Esq., Dorking (gr. Mr. Barrel), sent *Dendrobium* × 'Cybele,' Ellis var.

H. Shaw, Esq., Birch Vale (gr. Mr. J. Cliffe), sent two *Odontoglossums*.

J. T. Bennett-Poë, Esq., Cheshunt (gr. Mr. Downes), sent *Epidendrum Stamfordianum*.

W. C. Walker, Esq. (gr. Mr. G. Cragg), sent *Acineta Humboldtii*.

Messrs. Fisher, Son & Sibray, Handsworth, Sheffield, showed *Dendrobium Wardianum album*.

J. Rutherford, Esq., Blackburn (gr. Mr. J. Lupton), sent *Odontoglossum Andersonianum*.

The Right Hon. Lord Leigh (gr. Mr. H. T. Martin), showed flowers of a good *Lycaste Skinnerii*, which had borne twenty-five blooms.

E. Hockliffe, Esq., Uppingham, sent *Odontoglossum Andersonianum*.

Mr. Wm. Murray, Wylam-on-Tyne, showed examples of his patent Orchid Stand.

ORCHID COMMITTEE, MARCH 22, 1898.

HARRY J. VEITCH, Esq., in the Chair, and sixteen members present.

Awards Recommended:—

Silver Banksian Medal.

To Messrs. Hugh Low, Clapton, for a group of Orchids.

First-class Certificate.

To *Dendrobium nobile* *Ashworthianum* (votes, unanimous),

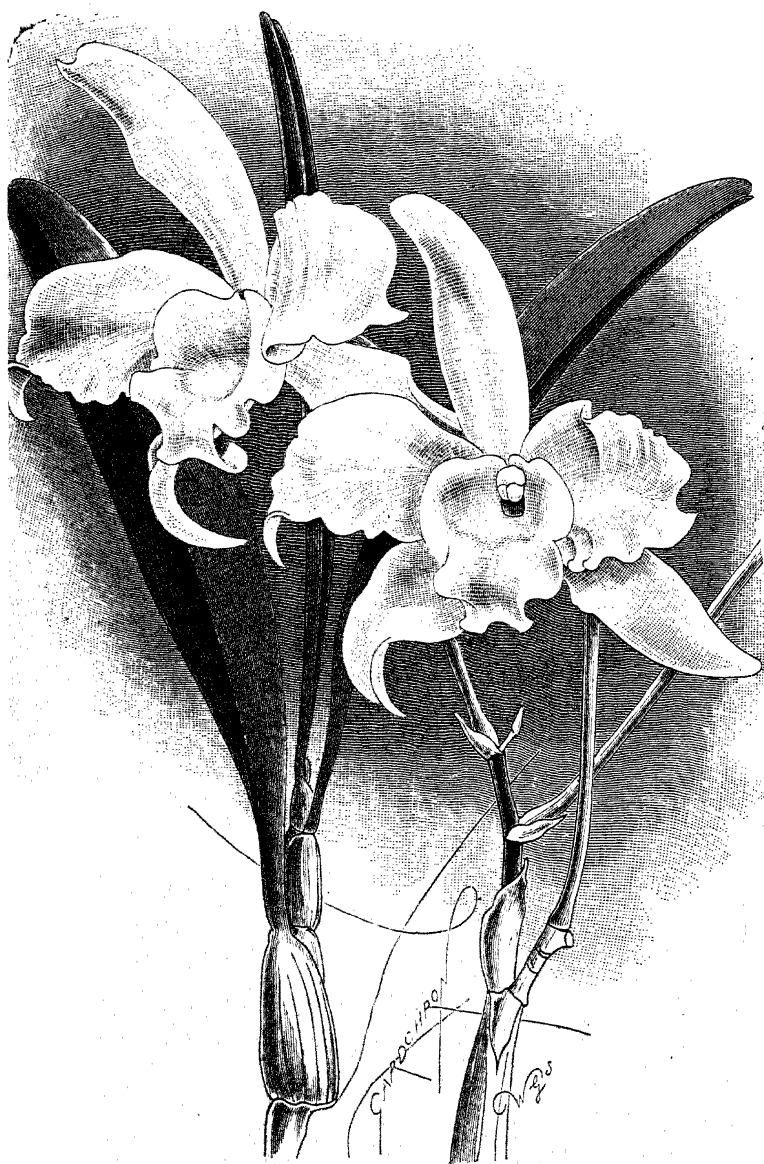


FIG. 16.—DENDROBIUM NOBILE ASHWORTHIANUM. (*Gardeners' Chronicle.*)

from Elijah Ashworth, Esq., Wilmslow, Cheshire (gr. Mr. Holbrook). The first white variety with no other colour than a greenish-yellow tinge at the base of the lip. (Fig. 16.)

To *Odontoglossum crispum* 'Princess Christian,' from Baron Sir H. Schröder, Staines (gr. Mr. H. Ballantine). A very large white flower, heavily blotched with dark brown. (Fig. 17.)

Award of Merit.

To *Odontoglossum* hybridum *Ashworthianum* (votes, unani-

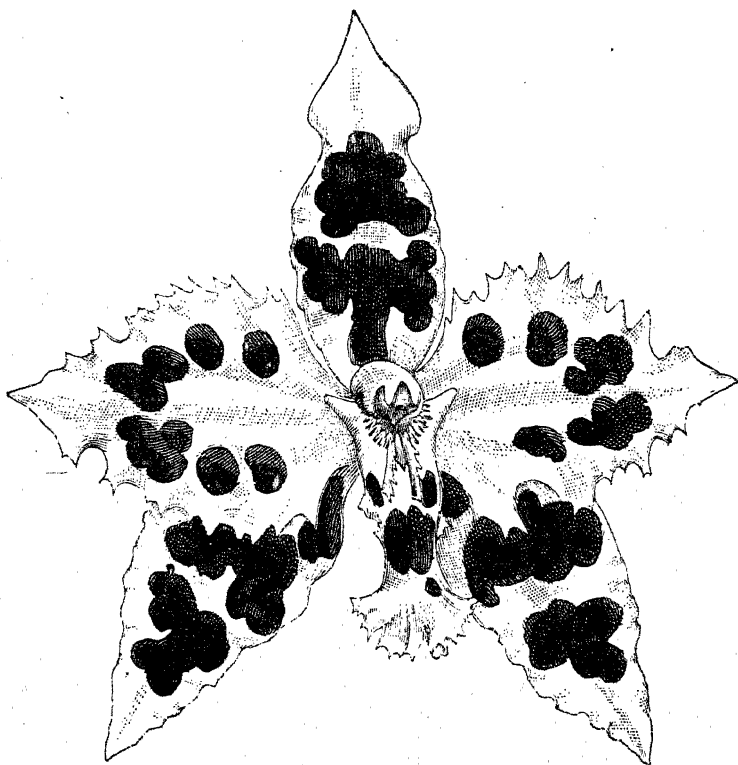


FIG. 17.—*ODONTOGLOSSUM CRISPUM* 'PRINCESS CHRISTIAN.' (*Journal of Horticulture*.)

mous), from Elijah Ashworth, Esq. (gr. Mr. Holbrook). A supposed hybrid between *Odontoglossum Cervantesii* lilacinum and *O. cordatum*. Flowers formed like *O. aspersum*; sepals yellow, barred brown; lip and petals bright rose colour.

To *Odontoglossum* × *Rochfordianum* (votes, unanimous), from Mr. T. Rochford, Turnford Hall. A distinct natural hybrid, in appearance nearest to *O.* × *Adrianæ*, Lind.

To *Oncidium Phalaenopsis Brandtiæ* (votes, 11 for, 3 against), from Frau Ida Brandt, Riesbach, Zurich (gr. Mr. Schlecht). A very large pure white form with purple markings on all the segments.

Cultural Commendation.

To Mr. Aldous, gr. to H. T. Pitt, Esq., Rosslyn, Stamford Hill, for *Odontoglossum* × *excellens*, Rosslyn var. One of the finest forms of *O.* × *excellens*.

Other Exhibits.

Messrs. B. S. Williams sent a nice group of Orchids.

Sir Trevor Lawrence, Bart. (gr. Mr. W. H. White), showed three finely-bloomed plants of the rare white and violet *Epidendrum Endresii*, *Masdevallia* × *Pourbaixii*, *M. Veitchiana grandiflora*, *Sarcochilus Hartmanii*, and *Epidendrum varicosum*.

J. T. Gabriel, Esq., Streatham Hill (gr. Mr. Ranson), showed the large-flowered *Cattleya Trianæi*, Gabriel's variety.

J. B. Brookes, Esq., Fenstall Park, Bromsgrove (gr. Mr. J. Drew), showed *Odontoglossum crispum roseum*.

Dr. F. Hills, Croydon, showed *Odontoglossum coronarium miniatum*.

Mrs. Laura C. Joad, Patching, Worthing (gr. Mr. Standing), sent *Cymbidium* × *eburneo-Lowianum*, and *C. eburneum*.

EXTRACTS FROM THE PROCEEDINGS

OF THE

ROYAL HORTICULTURAL SOCIETY.

GENERAL MEETING.

APRIL 12, 1898.

Mr. R. McLACHLAN, F.R.S., in the Chair.

Fellows elected (23).—Mrs. John Barker, Ernest E. H. Birch, Freeman Burrows, Ernest Chaplin, Mrs. Cotton, Allan Edward, Mrs. Allan Edward, H. J. Etherington, H. St. John Jackson (India), George F. Letts, W. W. Leuchars, Sir John Lister Kaye, Charles Mason, Frederick Miller, R. J. Morrish, A. Oakley, Junr., Lady Berkeley Paget, Douglas H. Pearson, Mrs. Phillimore, G. A. Powell, Cecil de M. Caulfeild Pratt, George Trinder, Walter G. Williams.

Societies affiliated (2).—Sunderland and District Horticultural Society, Ware and District Horticultural Society.

A lecture on "Blight and Blessing" (illustrated by magic-lantern slides) was given by Mr. Fred. Enock, F.L.S., F.E.S. (See p. 125.)

GENERAL MEETING.

APRIL 26, 1898.

Mr. JAS. HUDSON, V.M.H., in the Chair.

Fellows elected (27).—Mrs. L. R. Barker, Mrs. M. E. Barstow, Miss M. L. Birch-Reynardson, Mrs. Chaplin, Lady Churchill, Lady Colomb, Miss J. Dalton, Mrs. Dingwall, Samuel M. Everard, Mrs. Fisher-Watson, John E. Frewer, Mrs. Garrett, Alfred Gaut, Henry Greenwood, Arthur Gunter, Edmund Haslehurst, Lady Lucy Hicks-Beach, J. Fred. Kelly, J. Lanarch, E. Martin, Jacob W. Moorman, Miss Rowcliffe, Dr. Henry

Shackleton, Frank Tiernay, C. Vuylsteke (Ghent), Rev. Lewis B. White, D.D., Mrs. Wills.

A lecture on "Sweet Scented Leaves *versus* Fragrant Flowers" was given by Mr. F. W. Burbidge, M.A., V.M.H. (See p. 134.)

GENERAL MEETING.

MAY 10, 1898.

Mr. PHILIP CROWLEY, F.L.S., in the Chair.

Fellows elected (35).—Rev. J. W. W. Booth, Frederick Bull, Miss Etta Close, Frank Dickinson, Miss Dryden, Mrs. Dugdale, Lady Farquhar, Miss Foakes, Viscountess Folkestone, Sir Thomas Freake, Bart., E. C. French, W. Fyfe, Mrs. Gibbons, Mrs. H. Goschen, Countess Grey, Herbert Harris, Owen Harrison, F. J. Hubert, Thomas Hughes, R. E. Jackson, Mrs. H. Lonsdale, Ludwig Messel, Mrs. O'Hara, Countess Percy, Countess Portsmouth, Francis C. Powell (West Indies), Miss L. Ramsden, Herbert Reeves, John Riley, R. van der Schoot (Haarlem), Col. G. T. Skipwith, R.E., Mrs. R. Warton, R. G. Weston, Montague White, Miss de Winton.

Associate (1).—Miss Hilda Leese.

Societies affiliated (2).—Birchington and Acol Cottagers' Horticultural Society, Yatton, Congresbury, Cleeve, Kenn, and Kingston Seymour Cottagers' Horticultural Society.

A lecture on "Some of the Plants Exhibited" was given by the Rev. Prof. Geo. Henslow, M.A., V.M.H. (See p. 176.)

THE TEMPLE SHOW, 1898.

MAY 25, 26, and 27.

JUDGES.

Orchids.—S. Courtauld, James Douglas, J. Gurney Fowler, and F. J. Thorne.

Pot Plants in Bloom (*Orchids, Roses, and Begonias Excluded*).—John Jennings, C. E. Shea, W. Howe, and E. Hill.

Foliage Plants, Palms, &c.—Owen Thomas, E. Beckett, J. H. Fitt, and E. Molyneux.

Cut Flowers, Table Decorations, and Bouquets.—J. T. Bennett-Poë, Rev. G. H. Engleheart, James Hudson, and J. F. McLeod.

Roses and Begonias.—Rev. J. H. Pemberton, E. B. Lindsell, W. Bain, and C. E. Pearson.

Fruit and Vegetables.—George Norman, W. Poupart, J. Cheal, and James Smith.

Awards given by the Council after consultation with the Judges.

The order in which the names are entered under the several medals and cups has no reference to merit, but is purely accidental. The Awards given on the recommendation of the Fruit, Floral, and Orchid Committees will be found under their respective reports:—

Gold Medal.

To Sir Trevor Lawrence, Bart., Burford, Dorking (gr. Mr. White), for Orchids.

To Leopold de Rothschild, Esq., Gunnersbury House, Acton (gr. Mr. Hudson), for Fruit Trees in pots.

To Messrs. James Veitch, Chelsea, for Caladiums, Crotons, Cacti, Gloxinias, Streptocarpus, &c.

To Messrs. W. Paul, Waltham Cross, for Roses.

To Mr. George Mount, Canterbury, for Roses.

Silver Cups.

To Sir Frederick Wigan, Bart., Clare Lawn, East Sheen (gr. Mr. Young), for Orchids.

To H. S. Leon, Esq., Bletchley Park, Bucks (gr. Mr. Hislop), for Orchids.

To Earl Percy, Syon House, Brentford (gr. Mr. Wythes), for Orchids.

To Lord Aldenham, Elstree (gr. Mr. Beckett), for Vegetables.

To Sir J. Pease, Bart., M.P., Hutton Hall, Guisborough (gr. Mr. McIndoe), for Fruit.

To Messrs. Jackman, Woking, for Clematis and Herbaceous Plants.

To Messrs. Smith, Worcester, for Clematis.

To Messrs. Barr, Covent Garden, for Herbaceous Plants.

To Messrs. Cutbush, Highgate, for Foliage Plants and Carnations.

To Messrs. Charlesworth, Bradford, for Orchids.

To Messrs. Hugh Low, Enfield, for Orchids.

To Messrs. Sander, St. Albans, for Orchids and New Plants.

To Messrs. Linden, Brussels, for Orchids and New Plants.

To Messrs. Cypher, Cheltenham, for Orchids.

To Messrs. Box, Croydon, for Begonias.

To Messrs. Paul & Son, Cheshunt, for Roses and Herbaceous Plants.

To Messrs. Turner, Slough, for Roses, Pelargoniums, and Carnations.

To Messrs. Rivers, Sawbridge, for Fruit Trees in pots.

To Messrs. Sutton, Reading, for Vegetables.

To Messrs. Carter, High Holborn, for Vegetables and Flowering Plants.

To Messrs. Cannell, Swanley, for Cannas, Gloxinias, Calceolarias, and Begonias.

Silver-gilt Knightian Medal.

To Mrs. Wingfield, Ampthill (gr. Mr. Empson), for Vegetables.

To Messrs. Bunyard, Maidstone, for Apples.

To Mr. Mortimer, Farnham, for Cucumbers and Tomatos.

Silver-gilt Flora Medal.

To W. Thompson, Esq., Walton Grange, Staffs (gr. Mr. Stevens), for Orchids.

To Leopold de Rothschild, Esq., Ascott, Leighton Buzzard (gr. Mr. Jennings), for Carnations.

To Messrs. Ware, Tottenham, for Herbaceous Plants.

To Messrs. Perkins, Coventry, for Bouquets.

To Messrs. H. B. May, Edmonton, for Ferns.

To Messrs. Williams, Holloway, for Orchids and Table Decorations.

To Messrs. Lewis, Southgate, for Orchids.

To M. Jules Hye-Leyssen, Ghent, for Orchids.

To Messrs. Balchin, Hassocks, for Leschenaultias.

To Messrs. James Farnham Royal, for Calceolarias.

To Messrs. Fisher, Son, & Sibray, Sheffield, for Hardy Foliage Plants.

To Messrs. Kelway, Langport, for Pæonies, &c.

To Messrs. J. Waterer, Bagshot, for Rhododendrons.

To Messrs. Laing, Forest Hill, for Gloxinias, Caladiums, and Streptocarpus.

To Messrs. Peed, West Norwood, for Caladiums.

To Messrs. Cheal, Crawley, for Flowering Shrubs.

Silver-gilt Banksian Medal.

To Ludwig Mond, Esq., Regent's Park (gr. Mr. Clarke), for Orchids.

To Malcolm S. Cooke, Esq., Kingston Hill (gr. Mr. W. Buckell), for Orchids.

To G. J. Pritchard, Esq., Forest Gate, for Cacti.

To M. Louis de Smet Duvivier, Ghent, for Anthuriums.

To Mr. Edom, Epsom, for Tulips.

To Mr. Jones, Lewisham, for Begonias.

To Mr. Frank Cant, Colchester, for Roses.

To Mr. Rumsey, Waltham Cross, for Roses.

To Messrs. Backhouse, York, for Alpines.

To Messrs. Wallace, Colchester, for Hardy Plants.

To Mr. Seale, Sevenoaks, for Decorations.

To Messrs. Hill, Edmonton, for Ferns.

To Messrs. Birkenhead, Sale, for Ferns.

Silver Knightian Medal.

To the Marquis of Northampton, Castle Ashley (gr. Mr. Hayes), for Vegetables.

To the Horticultural College, Swanley, for Vegetables.

To Mr. Featherby, Gillingham, for Fruit.

Silver Flora Medal.

To Messrs. House, Westbury-on-Trym, for Violas.

To Messrs. Young, Stevenage, for Gloxinias.

To Mr. Perry, Winchmore Hill, for Herbaceous Plants.

To Mr. Stevens, Westminster, for Bouquets.

To Mr. Sydenham, Tamworth, for Violas.

To Mr. Calcutt, Stoke Newington, for Decorations.

To Mr. Prewett, Bayswater, for Decorations.

To Messrs. Jones, Shrewsbury, for Decorations.

- To Mr. Russell, Richmond, for Azaleas.
- To Mr. Prichard, Christchurch, for Herbaceous Plants.
- To Messrs. Miller, Fulham Road, for Mignonette.
- To Messrs. Cuthbert, Southgate, for Azaleas.
- To Messrs. Fromow, Acton Green, for Maples.
- To Mr. Iceton, Putney, for Foliage Plants.
- To Miss Cripps, Tunbridge Wells, for Maples.
- To "Jadoo, Limited," Exeter, for Plants.

Silver Banksian Medal.

- To Lord Foley, Esher (gr. Mr. Miller), for Strawberries.
- To A. Henderson, Esq., Faringdon (gr. Mr. Bastin), for Fruit and Vegetables.
- To W. Lawrence, Esq., , for Asparagus.
- To Herr Koster, Boskoop, Holland, for Azaleas.
- To Mr. Tulett, Swanley, for Zonal Pelargoniums.
- To Mr. Reid, of Beckenham, for Rhododendrons.
- To Mr. Chapman, Colchester, for Asparagus.
- To Mr. Godfrey, Colchester, for Asparagus.

GENERAL MEETING.

JUNE 14, 1898.

Dr. MAXWELL T. MASTERS, F.R.S., in the Chair.

Fellows elected (110).—Charles L. Adams, Robert E. Addey, Mrs. Arbutnot, Alfred Ashcroft, Henry Ashwell, J. Murray Bannerman, J.P., D.L., John L. Barker, Francis E. Barnes, Mrs. Walter Barnett, C. E. Baxter, Mrs. C. S. Bell, George W. Bellgrove, Mrs. E. Belsham, J. Wheeler Bennett, Mrs. Benyon, Henry A. Blyth, Mrs. Henry Blyth, Mrs. Bonham-Carter, Miss Broadwood, John W. Broomhead, James A. Brown (Australia), Dr. William Bruce, J. D. Charrington, Daniel Cooper, Mrs. Daniel Cooper, Mrs. Richard Creyke, Walter Cunliffe, W. Dale, W. Clement Daniel, M.D., John D. Dawson, J. Dowie (Johannesburg), W. Duckworth, Mrs. J. Ballantine Dykes, Countess of Eglinton, Mrs. A. Emmott, J. S. Empson, Sir William J. Farrer, John Ferguson, Charles E. Fletcher, Mrs. J. Forbes, Mrs. R. H. Fowler, Mrs. Henry H. France-Hayhurst, Jackson Gaskill, Walter Gaskill, W. Percy Gordon, J. Hubert, Grogan, E. H. Mayo Gunn, Mrs. Guyon, H. W. L. Harford,

Miss H. L. Hay, Lady Hayter, William Henning, J. T. Hester, H. M. Holman, Isaac House, James C. House, Major W. C. Hussey, Mrs. Izod, W. Adpar Jones, Edward C. Jukes, General R. H. Keating, V.C., C.S.I., Mrs. Sidney Lacon, Charles Lake, John Lambert, Rev. Edwin Lascelles, J. F. Laycock, John Layton, Captain Gerard F. Leather, G. C. Lees-Milne, Dowager Countess of Limerick, Mrs. M. L. Linton, Reginald Maples, Charles Mainwaring, John McKenzie, William J. Mitchell, John P. Morgan, Junr., William Phené Neal, C. W. Nieuwerf, George Ord, Mrs. Oxenham, Miss Oxenham, Walter G. Parkin, Rev. W. Pearce, Mrs. W. Pearce, James Price, Charles E. Purvis, Charles P. Ranger, Ernest W. Ravenscroft, Mrs. Ritter, Sydney Roberts, William Robertson, Lieut.-Col. John F. G. Ross-of-Bladensburg, C.B., C. P. Sandberg, J. D. Stuart Sim, F. W. Smith, Mrs. Gerald M. Soames, H. R. Starkey, F. Slade Stevens, Lieut. H. Studd, Thomas William Thornton, W. A. Vilney, Herbert W. Youell, J.P., Lady Clementine Walsh, Mrs. J. Overend Watson, James Weston, James Wigan, Rev. Richard Wilmot, Mrs. S. Wingfield, Marchioness of Worcester, C. B. E. Wright, J.P., D.L.

Associate (1).—Miss Evelyn Windermere.

A lecture on "Hybrid Orchids" was given by Mr. James O'Brien, V.M.H. (See p. 178.)

GENERAL MEETING.

JUNE 28, 1898.

Mr. HARRY J. VEITCH, F.L.S., in the Chair.

Fellows elected (23).—Howson F. Devitt, J. J. Done, Benjamin Forshaw, Edward Grizzelle (British Columbia), Mrs. M. Halliday, Arthur F. Hartshorn, Miss A. M. Hayhurst, E. Hockliffe, R. J. Leeson, H. J. Lewis, Mrs. Mackenzie, Archdeacon Thomas Meredith, Mrs. Moreing, Col. Wyndham Murray, Lady Ponsonby, W. B. Pratt, Robert Pybus, E. H. W. Rossiter, Major-General Nowell F. U. Sampson-Way, C.B., W. Walthew, G. C. Whitfield, Zorapore Wright, Mrs. Zorapore Wright.

A lecture on "Some of the Plants Exhibited" was given by the Rev. Prof. Geo. Henslow, M.A., V.M.H. (See p. 190.)

SCIENTIFIC COMMITTEE.

APRIL 26, 1898.

Dr. M. T. MASTERS, F.R.S., in the Chair.

Vine Leaves with Gummy Exudation.—Some leaves were received from Mr. F. M. Gulrin, Iscoed, remarkable for a stickiness. This appeared to be attributable to green-fly, although none was present. The exudation is the result of puncture.

Pæonies, Decayed.—Mr. F. F. Freeman sent some leaves which appeared to have decayed at the junction with the stem. They were forwarded to Dr. W. G. Smith for examination for the presence of fungi.

Growth of Ribes coccinea.—The Rev. Professor Henslow described a rather curious case of a bush growing by the south side of some palings, that had sent up a number of shoots on the north side. The shoots on the southern half were in full leaf, bearing very few racemes; while those on the other side were covered with flowers, the foliage being scarcely apparent.

SCIENTIFIC COMMITTEE, MAY 10, 1898.

Dr. M. T. MASTERS, F.R.S., in the Chair.

Morchella, Species.—Some specimens were sent of a small species of this fungus, which appeared in a garden-bed; but the locality was not recorded.

Peas, Decayed.—Mr. Cooke, The Croft, Detling, Maidstone, forwarded some young plants of the American Wonder, which had failed to grow. They were sown last November, and while many are doing well, others close by became a sickly yellow in colour. Mr. Sutton observed that his experience was, that no wrinkled Pea, such as the above, was suitable for autumn sowing; the skin being more delicate than that of round Peas, will not stand the winter so well. This was, therefore, the probable cause of failure.

Freesia Bulbs Arrested.—Mr. F. Egbert Hollond, Satis

House, Yoxford, sent some bulbs which had been planted last July: they had never thrown up any leaves, but had formed fresh bulbs upon the old ones, which had withered. It appeared to be a case common in Potatos, when it is called super-tuberation, fresh tubers being formed at the expense of the old one. It was possibly due to the Freesia bulbs having been planted at the wrong time of the year, energy being expended in a wrong direction.

Cineraria Hybrids.—Mr. James, Woodside, Farnham Royal, Slough, sent a collection of hybrids raised between (*C. cruenta* × Garden C.) ♂ × *lanata* ♀. They were a small selection of a numerous progeny, the greater number of which were said to resemble the garden form; but the present ones had a tomentose stem, branches, and under surface of the leaves, which last resembled in form those of *C. lanata*. The blossoms were rather small, some being a pure white, others mauve, and they were remarkable for their abundance. Unfortunately, the best plant with white flowers refuses to set much, if any, seed; but it was hoped that Mr. James would persevere and try to establish a new race, which would certainly be attractive from their silvery appearance.

Begonia Leaves Diseased.—Mrs. Caddy, Lion Gate Gardens, Richmond, sent some leaves of these plants decayed round the margins. They were forwarded to Dr. W. G. Smith for further examination.

SCIENTIFIC COMMITTEE, JUNE 14, 1898.

J. T. BENNETT-POË, Esq., in the Chair.

“*Silver*” *Leaf Disease*.—Specimens of this disease on Plum-trees were received from Mrs. Floyer, Basingstoke. The disease is known to be very common on Pomaceous plants, the silvery appearance being due to the raising of the epidermis from the underlying tissue. The disease is very fatal both indoors and out, and is in all probability attributable to the growth of a fungus the nature of which has not yet been ascertained.

Apple Leaves.—Some leaves probably injured by frost or scald from the effect of the sun shining on a damp surface were also sent.

Plant Diseases.—Dr. William G. Smith reports as follows on the specimens submitted to him:—

Pæonia Disease.—From a further specimen of this disease I have confirmed my previous opinion. The latest specimen sent bore the fructifications of a fungus which I hope to have identified. The diseased tissues contain abundant mycelium, and the starting point for attack was from last year's old wood. I shall be glad to communicate further results later.

Begonia Leaves.—From the material sent by Mr. Caddy it was difficult to say really what was the cause of disease. One or more fungi were easily developed on the withering leaves, but whether these were saprophytic on the dying tissue or were the cause of the trouble, it is not safe to say. Begonias of this class are so liable to wither at the margins (from draughts, &c.), and are so unsuitable for transit to a distance, that accurate observation can only be made on plants in their actual habitat.

Fungus on Thuya (Biota).—The plants sent were attacked by *Pestalozzia funerea*, Desm., a fungus well known to occur on dying Thuyas and allies. The life-history is, however, imperfect.

Cytisus Adami.—Mr. Herbert E. Brooks sent specimens of the curious *Cytisus Adami*, a well-known "graft hybrid," as it is supposed to be, for M. Adam budded *C. purpureus* on *C. Laburnum* in 1825. The purple and yellow flowers are of the true species, but the brick-red flowers are from the hybrid. It was described in the "Gardeners' Chronicle," 1841, pp. 325, 336; 1842, p. 397, and often subsequently. The fullest account is in Braun's "Rejuvenescence," 1851 (English translation, 1853); in Prof. Morren's paper in the "Belgique Horticole," 1871; and a summary of the whole subject is given in Darwin's "Variation of Animals and Plants," vol. i., ed. 2 (1875), p. 413.

SCIENTIFIC COMMITTEE, JUNE 28.

Dr. M. T. MASTERS, F.R.S., in the Chair.

Pyrethrum Flowers Arrested.—Mr. E. Ballard sent some flowers, "taken from healthy roots, full of bloom, but on which

some of the flowers fade, owing to the shrivelling of the stalk some two or three inches below the flower. Last year whole roots were affected." It is difficult to pronounce without seeing the early stages, but the general opinion was that frost had checked the buds, and a fungus, possibly a Myxomycete, followed. Buds of *Pyrethrum*, arrested in an early stage, appeared to have been spoilt by frost and wet having got into them.

Beeches Dying.—Mrs. A. C. Campbell Swinton, of Berrywell, Dunse, Berwickshire, sent some bark, &c., showing much decay, taken from a very fine old Beech at Kimmerghame. It was described as having a cavity at a fork in which rain-water lodged, but since the tree is only nineteen yards from the bed of the river, the suggestion that the roots have got into the cold soil by the side or beneath the river is, with very little doubt, correct. Beeches preferring dry soil by nature, the above would be a sufficiently probable cause. Mr. Wilks described a case where, in a space of 150 by 20 yards, every shrub and tree dies after a time. The destruction began with a hedge, then Scotch Firs, Oaks, Ashes, and lastly Beeches of about forty-five years of age perished. The cause appeared to be a bed of white sand into which the roots penetrated, thus starving the trees.

Black Currant Shoots Falling.—Mr. E. Ballard sent specimens from a large plantation, which break off at a slight touch or by the wind. Dr. William G. Smith, who has examined them, reports upon them as follows:—"The Currant leaves bore a mildew, but other fungi were also present when I examined the material. The characteristic mode of attack pointed to a species of *Peronospora*. I have raised good crops of one on fresh portions of the leaves, and am following up the clue. If it be really a species of this family it is new to Britain, although one (*Plasmopora ribicola*, Schröter) has been reported from the United States of America. I have observed the emission of motile swarm spores from the sporangia (so-called spores) of fresh material, and otherwise feel sure of the *Peronosporæ* nature of this fungus. As to remedy, I should recommend a spraying of Bordeaux Mixture or allied copper mixture. To a Black Currant plantation, this could be done by a knapsack-sprayer. Probably one can be had from the Strawson Company."

Cherry Leaves Diseased.—Specimens of the foliage was

received from Mr. B. G. Berry, F.R.H.S., Scarbutts Manor, Boughton, Faversham, and submitted to Dr. William G. Smith, who reports as follows:—"I cannot make up my mind whether the fungus on Cherry leaves you sent last week is *Cylindrosporium padi*, Karst, or *Cladosporium amygdalearum*, Pass. Both are given as causing spots on foliage similar to that sent. The spores are different, but I get both forms (or something very like them) present. In any case the fungus is the cause of trouble. The disease is common in the United States, though I have no definite record of its occurrence here. It is not considered serious, and yields easily to spraying remedies. I am afraid at present the crop is too far advanced to allow of immediate treatment, but as soon as it is plucked Bordeaux Mixture should be sprayed on the foliage. Next year the spraying should be continued as soon as the foliage is strong enough to allow it. The preparation of Bordeaux Mixture and allied fungicides I have already described in the 'Gardeners' Chronicle' last August. It should not be used towards the season of ripe fruit, as it stains the Cherries, but applied before and after is reliable."

Black Currant × *Gooseberry*.—Mr. W. Culverwell, of Thorpe Perrow, Bedale, sent a fruiting spray of this curious hybrid, figured in the "Gardeners' Chronicle," September 3, 1892, p. 271, showing well the resemblance to the manner of fruiting in the Currant, though it was entirely without its scent. The fruit resembled small Gooseberries, but the leaves had no spines.

Four-merous Odontoglossum.—Mr. McBean sent a spray of *O. crispum*, in which all the four blossoms upon it had the two anterior petals adherent to the sepal between them, three points indicating the fusion. In addition to the above, the sepals fused with the petals were petaloid and the ovaries were aborted. In two flowers it was S_2 , and in the other two, S_3 that was petaloid.

Tuberous Growth on Vine.—Dr. Masters exhibited a specimen of an outgrowth not uncommonly met with on Vines; similar ones are occasionally associated with a multiplication of buds. It is probably caused by a puncture of some insect, which sets up a subsequent growth by hypertrophy. A similar outgrowth is occasionally seen on *Maréchal Niel* Roses.

FRUIT AND VEGETABLE COMMITTEE.

APRIL 12, 1898.

PHILIP CROWLEY, Esq., in the Chair, and seventeen members present.

Awards Recommended:—*Cultural Commendation.*

To Mr. J. Miller, gardener to Lord Foley, Ruxley Lodge, Esher, for a very fine basket of Mushrooms, grown on ridges out of doors.

To Mr. E. Beckett, gardener to Lord Aldenham, Elstree, for a grand basket of forced 'Royal Sovereign' Strawberries.

To Mr. Jas. McLeod, gardener to J. P. Morgan, Esq., Dover House, Roehampton, for a superb basket of 'Brown Turkey' Figs.

Other Exhibits.

Mr. James Hicks, 8 Hatton Garden, W.C., sent a specimen of his Alarm Thermometer. The thermometer is hung in any glass-house, and the gardener on leaving the house, either by day or by night, sets the thermometer at any degree of heat or cold which he does not wish the temperature of the house to pass above or below, and as soon as the temperature reaches the point at which the gardener has set the instrument it immediately rings a bell in the gardener's bedroom, or in the bothy, or anywhere else it may be desired, thus warning him either that the fires need making up or that the ventilators need opening. The instrument is exceedingly simple, and should prove an excellent watch-dog for the gardener.

Mr. W. W. Bull, Ramsden, Billericay, sent a seedling Apple 'Aurora,' like a small 'Court Pendu Plat' in appearance, and in flavour like 'Lamb Abbey Pearmain.' The Committee would like to see it a month earlier in the year, before it has begun to shrivel.

FRUIT AND VEGETABLE COMMITTEE, APRIL 26, 1898.

PHILIP CROWLEY, Esq., in the Chair, and sixteen members present.

Awards Recommended :—

Silver-gilt Banksian Medal.

To Earl Percy (gr. Mr. Wythes, V.M.H.), Syon House, for a group of Vegetables.

To Mrs. Wingfield (gr. Mr. Empson), Amptill House, for a group of Fruit and Vegetables.

Award of Merit.

To Melon 'Lord Edward Cavendish' (votes, 13 for), from Her Majesty the Queen (gr. Mr. Owen Thomas), Windsor. A beautiful fruit of a bright primrose colour, excellently netted, not unlike 'Countess.' White and deep flesh, very juicy, and of fine flavour.

To 'Read's Sprouting Kale' (votes, 9 for, 6 against), from the Earl of Carnarvon (gr. Mr. J. Read). This is not a sprouting Broccoli, but a very good Ragged Jack Kale, excellent as a late spring green.

Cultural Commendation.

To Mr. H. T. Martin, gardener to Lord Leigh, Stoneleigh Abbey, for magnificent Seakale, some of the heads weighing considerably over a pound, and sweet and tender as well.

Other Exhibits.

Mr. H. Grimes, Ryde, sent a dish of 'Grange's Pearmain' Apples in first-rate condition. The fruits were of very bright colour, yellow flaked with crimson; a very large, deeply set closed eye; and a very short stalk in a shallow depression. The peculiarity of this variety is that the same tree generally produces fruits of two shapes, some flat, some conical.

Messrs. James Veitch, Chelsea, sent a Broccoli 'Market Favourite.'

A. Bull, Esq., Cottenham, sent an Apple 'Queenholme Seedling.' To look at it was very like a 'Hawthornden,' but so much later. It was rather dry.

Mr. Outram, Fulham, sent a Thermometer Holder.

Mr. J. Hicks, Hatton Garden, E.C., sent his Alarm Thermometer.

FRUIT AND VEGETABLE COMMITTEE, MAY 10, 1898.

PHILIP CROWLEY, Esq., in the Chair, and twenty members present.

Awards Recommended:—*Silver Knightian Medal.*

To the Marquis of Salisbury (gr. Mr. Norman), Hatfield House, for Strawberries 'Royal Sovereign.'

Award of Merit.

To Radish 'Forcing White Olive' (votes, unanimous), from Messrs. Sutton, Reading.

To Radish 'Forcing Carmine Oval' (votes, unanimous), from Messrs. Sutton, Reading.

To Radish 'First of All White Olive' (votes, unanimous), from Messrs. Barr, Covent Garden.

To Radish 'First of All Scarlet Olive' (votes, unanimous), from Messrs. Barr.

To Radish 'Woods Frame Red' (votes, unanimous), from Messrs. Watkins & Simpson, Strand.

[All the above Radishes had been grown at Chiswick, and it was considered that the first and third were identical, and also the second and fourth.]

Cultural Commendation.

To Mr. J. Ryder, gr. to the Countess of Limerick, St. Albans, for 'Alexander' Peach.

To Mr. J. Hudson (gr. to Leopold de Rothschild, Esq., Gunnersbury House), for Nectarine 'Cardinal.'

Other Exhibits.

A. Henderson, Esq. (gr. Mr. Bastin), Buscot Park, sent Strawberries, and Melon 'Buscot Park,' a cross between Countess' and 'Hero of Lockinge.'

Messrs. Paul & Son, Cheshunt, sent a pale coloured Asparagus called 'White Columbian.'

Earl Percy (gr. Mr. Wythes), Syon House, showed a collection of French Beans, grown from seeds sown on March 28; also a new Cabbage Lettuce.

C. Bayer, Esq. (gr. Mr. Taylor), Forest Hill, sent fruits of 'Waterloo' Peaches, grown on pot trees.

FRUIT AND VEGETABLE COMMITTEE, MAY 25, 1898.

TEMPLE GARDENS.

PHILIP CROWLEY, Esq., in the Chair, and twenty members present.

Awards Recommended :—

The Cups and Medals awarded by the Council will be found recorded on p. lvi.

Award of Merit.

To Apple 'Ontario' (votes, 13 for), from Messrs. Bunyard, Maidstone.

Cultural Commendation.

To Mr. R. E. Addey, Brentford, for Mushrooms.

To Mr. J. Ryder, St. Albans, for Peaches 'Grosse Mignonne.'

Other Exhibits.

Mr. Nicholls, Lower Tooting, sent 'White Forcing' Celery.

Mr. S. Mortimer, Farnham, sent Cucumbers 'The Keeper' ('Duke of Edinburgh' × 'Improved Telegraph') and 'Sensation'; also Tomato 'The Trusser.'

Sir Joseph Pease, Bart., M.P. (gr. Mr. McIndoe), sent Melon 'The Model' ('Best of All' × 'Scarlet Premier').

Mr. Thos. Robinson, Hollingbourne, sent a box of Melons.

Mrs. Wingfield (gr. Mr. Empson) sent Apple 'Empson's Favourite,' a seedling from 'Beauty of Kent.'

Messrs. Bunyard sent Apples 'King of Tompkins County' and 'Calville Malingre.'

FRUIT AND VEGETABLE COMMITTEE, JUNE 14, 1898.

PHILIP CROWLEY, Esq., in the Chair, and fifteen members present.

Awards Recommended :—*Award of Merit.*

To Cabbage 'Beaconsfield' (votes, 6 for), grown at Chiswick from seed sent by Mr. J. Prowse, Hall Barn, Beaconsfield.

The seed was sown in August. Hearts tender, medium-sized, conical.

To Cucumber 'The Keeper' (votes, 12 for), from Mr. S. Mortimer, Farnham ('Improved Telegraph' × 'Duke of Edinburgh'). Very fine fruits with prominent spines; skin very dark, but covered with a grand bloom.

To Melon 'Empson's Seedling' (votes, 14 for), from Mrs. Wingfield (gr. Mr. Empson), Ampthill ('Anthony's Favourite' × 'Eastnor Castle'). A round fruit of fair size, well netted, with yellow skin and white flesh.

Cultural Commendation.

To Mr. E. Becket, gardener to Lord Aldenham, Elstree, for Spinach 'The Carter.' The leaves were some of them 14 inches across the shoulder and 15 inches long.

To Mr. James Hudson, gardener to Leopold de Rothschild, Esq., Gunnersbury, for magnificent specimens of 'Lord Napier' Nectarine.

Other Exhibits.

Col. Brymer, Dorchester, sent Apples 'Reinette du Canada' and 'Dutch Mignonne.'

Mr. S. Mortimer sent Cucumber 'Sensation,' very fine, dark green, smooth fruits ('Matchless' × 'Improved Telegraph').

Leopold de Rothschild, Esq. (gr. Mr. Hudson), sent Cherry 'Guigne d'Annonay,' grown in the open air on a south wall, ten days earlier than 'Early Rivers.' It obtained a certificate in 1881.

FRUIT AND VEGETABLE COMMITTEE, JUNE 28, 1898.

PHILIP CROWLEY, Esq., in the Chair, and sixteen members present.

Awards Recommended:—

Silver-gilt Knightian Medal.

To A. von André, Esq. (gr. Mr. Gleeson), The Warren, Stanmore, for nine magnificent 'Queen' Pines, averaging more than 5½ lbs. each in weight.

Silver Banksian Medal.

To Leopold de Rothschild, Esq. (gr. Mr. Hudson), Gunnersbury House, for a collection of Tomatos and Cherries.

First-class Certificate.

To Peach 'Thomas Rivers' (votes, 11 for), from Messrs. Rivers, of Sawbridgeworth.

Cultural Commendation.

To Mr. I. J. Rolfe, Stanford-le-Hope, for Tomatos 'Rolfe's Challenge,' a fine variety of good flavour. The Committee hoped to see it grown at Chiswick.

Other Exhibits.

Colonel Platt, C. B., Gorddinog, Llanfairfechan (gr. Mr. W. Coates), sent Melon 'Gorddinog Seedling,' green skin covered all over with white netting; red flesh. It promised well, but was not quite ripe.

Mr. W. Edwards, Grove Lodge, Guildford, sent a new Pea, 'Early Queen,' which was requested to be tried at Chiswick.

Messrs. J. Veitch, of Chelsea, sent Cherry 'Guigne d'Annonay,' grown on pyramids in the open air.

FLORAL COMMITTEE.

APRIL 12, 1898.

W. MARSHALL, Esq., in the Chair, and twenty four members present.

Awards Recommended:—

Silver-gilt Banksian Medal.

To Mr. May, Edmonton, for Roses, Acers, and Spiræas.

Silver Flora Medal.

To Messrs. W. Paul, Waltham Cross, for Camellias.

To Messrs. Paul & Son, Cheshunt, for Roses in pots.

To Mr. Rumsey, Waltham Cross, for Roses.

Silver Banksian Medal.

To Mr. Walker, Thame, for Roses.

Bronze Flora Medal.

To Messrs. Carter, High Holborn, for Cinerarias.

To Messrs. Wallace, Colchester, for hardy plants.

Bronze Banksian Medal.

To Lord Gerrard, Eastwell Park, Ashford (gr. Mr. Walters), for Roses.

To Mr. Kemp, The Gunyah, Barnes, for Azaleas.

Award of Merit.

To *Hippeastrum* 'Daones' (votes, 13 for, 5 against), from Messrs. James Veitch, Chelsea. The funnel-shaped rich scarlet flowers are irregularly margined with white.

To *Camellia* 'Pride of Waltham' (votes, unanimous), from Messrs. W. Paul. A very handsome variety, with large delicate pink flowers, bordered and suffused with silvery white.

To *Camellia* 'Duchess of Teck' (votes, 11 for, 6 against), from Messrs. W. Paul. The splendidly shaped medium-sized flowers are of a pleasing shade of salmon pink.

To *Camellia* 'Mrs. J. Buchanan' (votes, 10 for, 5 against), from Messrs. W. Paul. Beautiful semi-double flowers, striped and speckled with pink on a white ground.

To *Dracena aurea striata* (votes, 7 for, 6 against), from Messrs. Low, Enfield. This variety is in much the same way as *D. Lindeni*, with long, broad, drooping, glossy green leaves, striped with pale yellow.

Cultural Commendation.

To Mr. C. Turner, Slough, for three plants of *Nepeta Glechoma variegata*.

Other Exhibits.

Sir Peter Walker, Osmaston Manor, Derby (gr. Mr. Bardney), sent four seedling *Clivias* of much promise.

Lord Aldenham, Elstree (gr. Mr. Beckett), sent a group of *Deutzia gracilis variegata*.

F. W. Sharpe, Esq., Waltham, St. Lawrence (gr. Mr. Keeble), sent white Primroses.

Purnell Purnell, Esq., Woodlands, Streatham, brought a collection of Alpine Primulas.

From F. T. Barry, Esq., Windsor (gr. Mr. Brown), came a collection of Camellias grown in the open air.

Lord Foley, Ruxley Lodge, Esher (gr. Mr. Miller), sent Violets and Daffodils.

Mr. G. Trinder, Dogmersfield, Winchfield, sent specimens of *Richardia Rehmanni*.

Messrs. Hill, Edmonton, sent a collection of Ferns.

Messrs. Laing, Forest Hill, brought a group of *Streptocarpus*.

Messrs. Sutton, Reading, sent a large and most interesting group of *Cinerarias* obtained by crossing *C. cruenta* and *C. multiflora*. The plants were of slender habit, and carried large loosely arranged panicles of small variously coloured flowers.

Messrs. Cutbush, Highgate, sent a group of forced shrubs.

Messrs. James Veitch, Chelsea, sent *Amaryllis*, hardy shrubs, and hybrid *Cinerarias*.

FLORAL COMMITTEE, APRIL 26, 1898.

W. MARSHALL, Esq., in the Chair, and twenty-nine members present.

Awards Recommended :—

Silver-gilt Banksian Medal.

To Mr. Mount, Canterbury, for Roses.

Silver Flora Medal.

To Sir Trevor Lawrence, Bart., Burford (gr. Mr. Bain), for *Anthuriums*.

To Messrs. Laing, Forest Hill, for *Gloxinias*.

To Mr. May, Edmonton, for Gold and Silver Ferns.

Silver Banksian Medal.

To Mr. Rumsey, Waltham Cross, for Roses.

To Messrs. Cuthbert, Southgate, for hardy *Azaleas*.

To Messrs. Linden, Brussels, for *Anthuriums*.

To Messrs. Osman, Commercial Street, for dried Ferns.

Bronze Banksian Medal.

To Lord Wantage, Lockinge Park, Wantage (gr. Mr. Fife), for a lovely group of 'Fortune's Yellow' Rose.

Award of Merit.

To Primrose 'Evelyn Arkwright' (votes, unanimous), from J. H. Arkwright, Esq., Hampton Court, Leominster. A magnificent variety of the common Primrose, with very large flowers

borne on long stout stalks. The original plant was found growing wild in Dinmore Wood, Herefordshire, eleven years ago. It retains its character when raised from seed. (Fig. 36.)

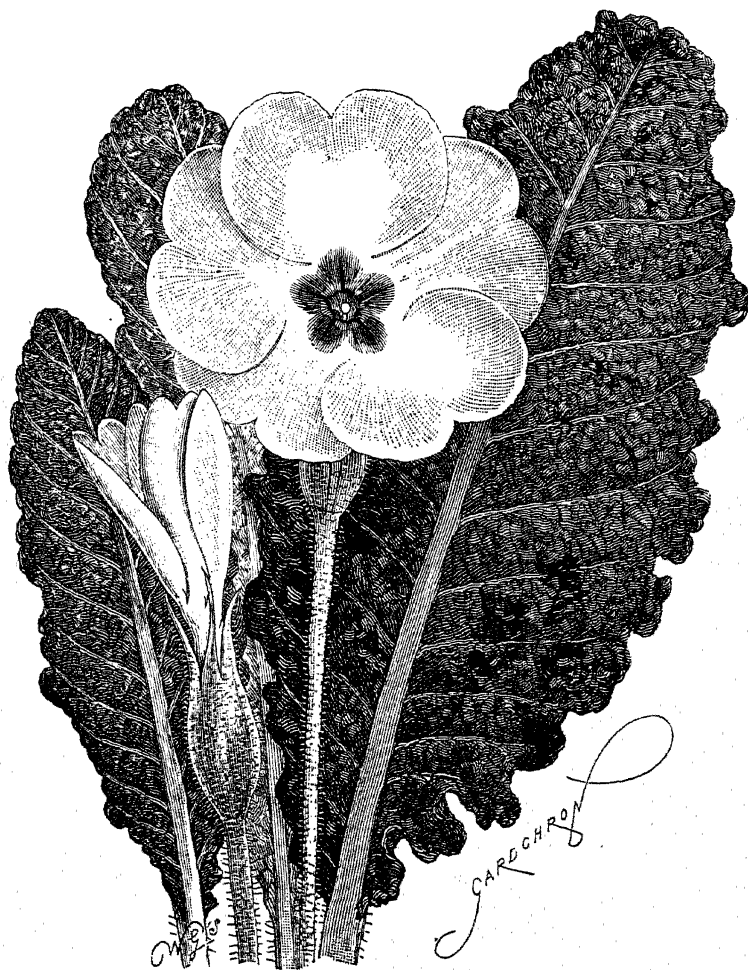


FIG. 36.—PRIMROSE 'EVELYN ARKWRIGHT.' (*Gardeners' Chronicle*.)

To *Calla Rhodesia* (votes, 20 for, 1 against), from Leopold de Rothschild, Esq., Ascott (gr. Mr. Jennings). The large deep buttercup-yellow spathes are of good form and substance. The

deep green triangular leaves are spotted with silvery white, similarly to those of *C. Elliottiana*.

To *Pteris cretica* *Summersi* (votes, unanimous), from Mr. H. B. May. This is a distinct, compact, free-growing variety, with bright green, deeply crested fronds.

To *Azalea* '*J. J. de Vink*' (*mollis* \times *sinensis*) (votes, 19 for, 4 against), from Messrs. Cuthbert. Immense trusses of large pale orange flowers, suffused with salmon and spotted with brown on the upper petals.

To *Deutzia parviflora* (votes, unanimous), from Messrs. James Veitch. Plant of bushy, free-flowering habit, with corymbs of small pure-white flowers.

To *Rose* '*Psyche*' (votes, 20 for), from Messrs. Paul & Son, Cheshunt. This charming *Polyantha* variety was obtained by crossing '*Golden Fairy*' with '*Crimson Rambler*.' The small well-formed flowers are of a delicate shade of pink, and borne in clusters with great freedom. (Fig. 37.)

To *Rose* '*The Dawson*' (votes, 14 for, 13 against), from Messrs. Paul & Son. A free-growing *Polyantha* with small semi-double rose-pink flowers.

Botanical Certificate.

To *Azaleodendron* '*Edouard André*' (*A. mollis* \times *Rhododendron ponticum* var.) (votes, unanimous), from Messrs. James Veitch. The clusters of medium-sized bright-pink flowers of this interesting hybrid are spotted with crimson on the upper petals. The evergreen leaves are lanceolate, with crisped margins.

Cultural Commendation.

To Mr. Empson, gardener to Mrs. Wingfield, Ampthill House, for *Trillium grandiflorum album*.

Other Exhibits.

The Dowager Lady Bowman, Joldwynds, Dorking, sent flowers of a very pretty parasite *Lathræa clandestina*, which grows freely on the roots of Willows in damp ground.

Sir John T. D. Llewelyn, Bart., Penllergaer, Swansea (gr. Mr. Warmington), contributed a very interesting collection of Himalayan *Rhododendrons*, all grown out of doors.



G. Dixon, Esq., Astle Hall, Chelford, sent a small group of Polyanthuses.

From F. W. Moore, Esq., Glasnevin, came a very large cluster of flowers of *Brownea ariza*, a rare and beautiful stove-climber.

G. F. Wilson, Esq., Weybridge, sent Primroses.

J. K. Parker, Esq., Evening Hill, Carlisle, sent gold-laced Polyanthus 'Miss Isabel Jay.'

Mr. P. Guisquet, Chantenay, Nantes, sent double Anemones.

Messrs. James Veitch, Chelsea, brought Begonia 'Eudoxa' (*B. decora* ♂ × *B. Burkei* ♀), a variety with pretty ornamental foliage.

Mr. Walker, Thame, sent Roses.

Messrs. Wallace, Colchester, sent hardy plants.

Messrs. Peed, West Norwood, sent Dracænas.

From Messrs. Paul & Son, Cheshunt, came herbaceous and alpine plants.

FLORAL COMMITTEE, MAY 10, 1898.

W. MARSHALL, Esq., in the Chair, and twenty-five members present.

Awards Recommended:—

Silver Gilt Flora Medal.

To Messrs. Barr, Covent Garden, for Tulips and hardy flowers.

Silver Flora Medal.

To Messrs. W. Paul, Waltham Cross, for Roses in pots.

To Mr. Mount, Canterbury, for Roses.

Silver Banksian Medal.

To Mr. May, Edmonton, for Codiaëums (Crotons).

To Messrs. Cutbush, Highgate, for flowering and foliage plants.

To Messrs. Paul & Son, Cheshunt, for herbaceous plants and sprays of flowering trees and shrubs.

Award of Merit.

To *Azalea indica* 'Madame Joseph Vervæne' (votes, unanimous), from Mr. Turner, Slough. An exceptionally free-flowering variety with large semi-double salmon-pink flowers streaked with red and spotted with bright rose at the base of the upper petals.

To *Azalea indica* 'Ami Charles Vermeire' (votes, unanimous), from Mr. Turner. Flowers of medium size and good substance; dull crimson with numerous small rich crimson dots on the upper petals.

To *Alyssum saxatile* fl. pl. (votes, 14 for), from Messrs. Paul & Son, Cheshunt. The small semi-double deep golden yellow flowers are borne with great freedom. Its habit of growth resembles the type.

To alpine *Auricula* 'Perfection' (votes, unanimous), from Mr. Douglas, Great Bookham. Flowers very large, rich crimson, with a deep golden yellow eye.

To alpine *Auricula* 'Dean Hole' (votes, unanimous), from Mr. Douglas. Flowers crimson, shaded with maroon towards the canary yellow centre.

To alpine *Auricula* 'Xixa' (votes, unanimous), from Mr. Douglas. Flowers of medium size, centre rich yellow encircled with maroon-crimson, which runs to orange red towards the edges of the petals.

To strain of Giant *Auriculas* for house and garden decoration (votes, unanimous), from Mr. D. Storrie, St. Madoes Cottage, Glencarse. This remarkably fine strain is the result of fifteen years' selection from an accidental seedling found in a bed of ordinary border seedlings. The delicately fragrant flowers are large and handsome, and of many shades of yellow, in some cases nearly white. The plants had been grown out of doors without protection.

Other Exhibits.

B. Bennett, Esq., Cheverells Park, Dunstable, sent a large panicle of *Dracæna indivisa*.

Rev. Joseph Jacob, Whitewell Rectory, Whitchurch, sent flowers of a large and somewhat rough yellow-flowered *Auricula*, named 'Wales.'

Philip Crowley, Esq., Waddon House, sent a plant of *Medicago scutellata*.

Messrs. Jas. Veitch, Chelsea, brought a small group of hardy foliage and flowering shrubs.

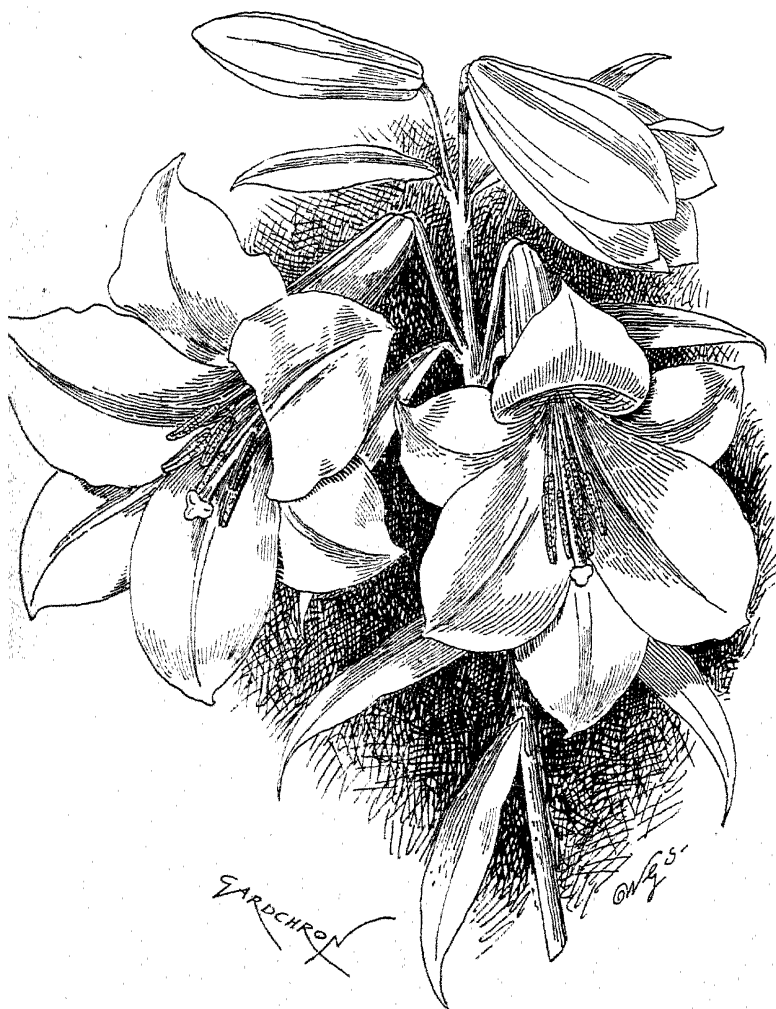


FIG. 38.—*LILIUM RUBELLUM*. (*Gardeners' Chronicle*.)

Mr. A. J. Willmot, Withycombe, Exmouth, sent a double Primrose.

Mr. Stevens, Putney, sent five varieties of Carnations.

Messrs. James, Slough, sent an interesting group of hybrid Cinerarias.

Mr. Tulett, Swanley, sent *Pelargonium* 'A. Tulett.' The Committee requested that a plant might be sent to Chiswick for comparison with those on trial there.

Mr. James Bryson, Helensborough, sent specimens of a very fine Rose named 'Day-dream.' The Committee thought highly of it, and expressed a wish to see flowers from plants grown in the open ground.

Messrs. Cheal, Crawley, sent sprays of flowering trees and shrubs.

From Messrs. Balchin, Hassocks, came splendidly flowered specimens of *Boronia serrulata*, *Erica perspicua nana*, and *Browallia major*.

Messrs. Miller, Fulham Road, sent East Lothian Stocks and Pyrethrums.

FLORAL COMMITTEE, MAY 25, 1898.

TEMPLE GARDENS.

W. MARSHALL, Esq., in the Chair, and twenty-three members present.

Awards Recommended :—

The list of Cups and Medals awarded by the Council will be found on p. lvi.

First-class Certificate.

To *Lilium rubellum* (votes, unanimous), from Messrs. Wallace, Colchester. A new hardy Japanese species, of slender habit, growing to a height of about 18 in., with small rich green lanceolate leaves and funnel-shaped rose-pink flowers. (Fig. 38.)

To *Acalypha Sanderi* (votes, unanimous), from Messrs. Sander, St. Albans. A distinct and attractive stove plant, with deep green ovate leaves and long pale green petioles. The conspicuous spikes of blossom, often 20 in. in length, composed of rich crimson flowers, are somewhat similar to those of the popular 'Love Lies Bleeding.'

To *Licuala Jeananceyi* (votes, 7 for), from Messrs. Sander. This very rare and beautiful Palm is of dwarf, compact habit, with deep green fan-shaped leaves, divided into eight deeply notched leaflets.

To *Phlebodium glaucum* Mayi (votes, unanimous), from Mr. May, Edmonton. A distinct and graceful Fern, with broad glaucous fronds. The beautifully undulated pinnæ are crimped at the margins. (Fig. 39.)

Award of Merit.

To *Phyllocactus 'Epirus'* (votes, unanimous), from Messrs. J. Veitch, Chelsea. A magnificent variety, with large well-formed pale pink flowers. (Fig. 40.)

To *Phyllocactus 'Agatha'* (votes, unanimous), from Messrs. Veitch. Medium-sized pale salmon flowers, suffused with a deeper shade in the centre.

To *Eremurus Elwesianus* (votes, unanimous), from Mr. Ware, Tottenham. The small flesh-coloured flowers, striped with pink down the centre of each petal, are borne in great abundance on stout spikes, 7 ft. in height.

To *Tuberous Begonia 'Mr. Dunbar Wood'* (votes, unanimous), from Mr. Ware. A charming variety, with double orange-yellow flowers of excellent form.

To *H. T. Rose 'Aurora'* (votes 9 for, 3 against), from Messrs. W. Paul, Waltham Cross. Flowers large, handsome, sweetly scented, and of a delicate shade of pink, suffused with rose in the centre.

To *Caladium 'Guaratinguetor'* (votes, 10 for), from Messrs. Laing, Forest Hill. A magnificent variety, with rich crimson leaves blotched and margined with bronze green.

To *Ilex Aquifolium 'Golden King'* (votes, 10 for), from Messrs. Little & Ballantyne, Carlisle. This beautiful Holly is as hardy as *I. A. Hodginsi*, from which it is a sport. It is of free growth, with large leaves, pale green in the centre, and irregularly margined with golden yellow.

To *Anthurium Scherzerium 'Senateur Montefior Leves'* (votes, 9 for, 1 against), from M. L. de Smet Duvivier, Ghent, Belgium. A distinct variety with broad spathes, white ground, mottled, and spotted with crimson scarlet.



FIG. 40. — GROUP OF PHYLLOCACTUS. (*Gardeners' Chronicle*.)

To Auricula 'Snowdrop' (votes, 7 for), from Mr. R. Dean, Ealing. A variety with double white flowers.

To Areca Ilsemanni (votes, 8 for), from Messrs. Sander. This handsome and distinct Palm is a native of New Guinea, and well adapted for decoration. Leaves gracefully arched, pinnæ 7 in. long by $\frac{1}{2}$ in. broad, set about $\frac{3}{4}$ in. apart on dark chocolate petioles. The young leaves are of a bright copper red, turning green as they mature.

To Caladium 'Ami Schwartz' (C. albanense \times C. 'Madame J. Box') (votes, unanimous), from Messrs. Sander. Heart-shaped leaves, of a dull red, with crimson veinings and bordered with bronze green.

To Tree Pæony 'Henry Irving' (votes, 10 for), from Messrs. Kelway, Langport. A variety with very large crimson-maroon flowers.

To Tree Pæony 'Julius Cæsar' (votes, unanimous), from Messrs. Kelway. Large semi-double crimson flowers, striped with scarlet down the centre of each petal.

To Tree Pæony 'Jean de Reszke' (votes, 10 for), from Messrs. Kelway. Flowers pure white, of great size and substance.

Other Exhibits.

Mr. Perkins, Leamington, sent a group of Carnation 'Primrose Queen.'

From Mr. Douglas, Great Bookham, came an interesting collection of Alpine Auriculas.

Mr. Palmer, Andover, sent two varieties of Lobelias.

Mr. John Pigg, Royston, sent specimens of Pelargonium 'Agnes Alma.'

FLORAL COMMITTEE, JUNE 14, 1898.

W. MARSHALL, Esq., in the Chair, and twenty-six members present.

Awards Recommended :—

Silver-gilt Flora Medal.

To J. P. Morgan, Esq., Dover House, Roehampton (gr. Mr. J. F. McLeod), for Malmaison Carnations.

To Messrs. Cannell, Swanley, for Cannas, Begonias, and Aquilegias.

Silver-gilt Banksian Medal.

To Messrs. Barr, King Street, Covent Garden, for hardy flowers.

Silver Flora Medal.

To Mr. May, Edmonton, for new and rare Ferns.

To Messrs. Kelway, Langport, for Pæonies and Pyrethrums.

To Messrs. J. Veitch, Chelsea, for herbaceous plants and hardy shrubs.

Silver Banksian Medal.

To the Marquis of Salisbury, Hatfield House, Hatfield (gr. Mr. Norman), for Carnations.

To Messrs. W. Paul, Waltham Cross, for Rhododendrons and Roses.

To Messrs. Wallace, Colchester, for cut flowers.

First-class Certificate.

To Mikania Sanderi (votes, unanimous), from Messrs. Sander, St. Albans. A very ornamental foliage plant of climbing habit. The richly coloured ovate bronze-green leaves are shaded and mottled with pale green towards the centre, the under surface being shaded with purple.

To Calochortus Purdyi (votes, 9 for, 8 against), from Messrs. Wallace. Creamy-white flowers, covered with short silky hairs on the interior of the lower portion of the petals.

Award of Merit.

To Philadelphus coronarius 'Mont Blanc' (votes, 14 for), from Messrs. J. Veitch. Plant of dwarf, compact habit, resembling P. microphyllus. The small pure white flowers are very fragrant and produced with great freedom.

To Gloxinia 'Galatea' (votes, 13 for), from Messrs. J. Veitch. White flowers, margined with purplish violet.

To Pæony 'Ella Christine Kelway' (votes, 16 for, 1 against), from Messrs. Kelway. Large double blush-pink flowers. The guard petals are very broad and shaded with salmon pink.

To Pyrethrum 'Lady Kildare' (votes, 10 for, 5 against), from Messrs. Kelway. Double rose-pink flowers, touched with orange in the centre.

To Canna 'Mrs. W. Marshall' (votes, unanimous), from Messrs. Paul & Son, Cheshunt. Plant of dwarf, sturdy habit, with large deep golden-yellow flowers, spotted and streaked with crimson scarlet.

To Canna 'Mosaic' (votes, unanimous), from Messrs. Paul & Son. Plant of dwarf habit, with canary-yellow flowers, heavily spotted and netted with vermillion.

To *Meconopsis cambrica plena* (votes, 15 for), from Messrs. Paul & Son. A variety of the Welsh Poppy, with double flowers.

To *Pyrethrum* 'Monarch' (votes, unanimous), from Messrs. Collins, Waterloo Road. The flowers of this variety are very large, single, rose pink, with orange-yellow centre.

To *Caladium* 'Lord Annesley' (votes, 11 for), from Messrs. Sander. Ovate lanceolate leaves, carmine in the centre, bordered with green, and slightly crimped at the margin.

To *Begonia Rex* 'Mrs. F. Sander' (votes, unanimous), from Messrs. Sander. Handsome leaves of good shape, dull crimson in the centre near the footstalk, surrounded by rose pink, and margined with bronze green.

To Tuberous *Begonia* 'Commodore Dewey' (votes, 10 for, 3 against), from Messrs. Cannell, Swanley. Crimson scarlet flowers, large, and of excellent shape.

Other Exhibits.

The Hon. Marsham Townsend, Frognall, sent Carnations.

From Miss S. Putman, Harlesden, came paintings of flowers and fruits.

Martin R. Smith, Esq., Warren House, Hayes (gr. Mr. C. Blick), sent Carnations.

From Sir Trevor Lawrence, Bart., Burford (gr. Mr. W. Bain), came a very interesting collection of cut flowers.

C. E. Wheeler, Esq., Bramley, Surrey, sent Carnation 'Mrs. C. E. Wheeler.'

From Lady Plowden, Aston Rowant, Tetsworth, came beautiful specimens under the name of *Bignonia Lindleyana* (syn. *B. cherere*), but now recognised as *B. buccinatoria*, figured in "Bot. Mag." t. 7516. The Committee asked to see this again.

G. C. Whitfield, Esq., Mount Sherborne, Eastbourne, sent

flowers of a beautiful Ivy-leaved Pelargonium 'Pride of Mount Sherborne.' The Committee asked to see a plant.

Rev. E. S. Lowndes, Clergy House, West Malvern, sent cut flowers of Rose 'Silver Ophirée.'

Messrs. Paul, Cheshunt, brought a group of Cannas, Roses, and Rhododendrons.

Messrs. Collins, Waterloo Road, sent a group of hardy flowers.

Messrs. Cheal, Crawley, sent sprays of ornamental shrubs.

Mr. J. Russell, Richmond, sent a group of hardy flowers.

Mr. J. Stredwick, Silverhall Park, St. Leonards, sent Dahlias.

Messrs. Brown, Stamford, sent a scarlet flowered zonal Pelargonium named 'John French.'

Mr. Perkins, Leamington, sent Carnation 'Primrose Queen.'

Mr. Davies, Hoylake, sent a single flowered Chrysanthemum.

Messrs. Miller, Fulham Road, sent Petunias and Mignonette.

Miss Hankey, Cambridge Street, brought a very dwarf Japanese Maple.

Messrs. Sander, St. Albans, sent a group of flowering and foliage plants.

FLORAL COMMITTEE, JUNE 28, 1898.

W. MARSHALL, Esq., in the Chair, and twenty-two members present.

Awards Recommended :—

Silver-gilt Flora Medal.

To Right Hon. Lord Aldenham, Elstree (gr. Mr. Beckett), for foliage and flowering plants.

Silver-gilt Banksian Medal.

To Mr. May, Edmonton, for ninety species and varieties of Adiantums.

To Martin R. Smith, Esq., Hayes (gr. Mr. Blick), for Malmaison Carnations.

Silver Flora Medal.

To Messrs. Kelway, Langport, for Pæonies and Delphiniums.

To Messrs. Cutbush, Highgate, for Carnations.

To Messrs. J. Veitch, Chelsea, for Canterbury Bells, Pæonies,
and Delphiniums.

To the Marquis of Salisbury, Hatfield (gr. Mr. Norman), for
Malmaison Carnations.

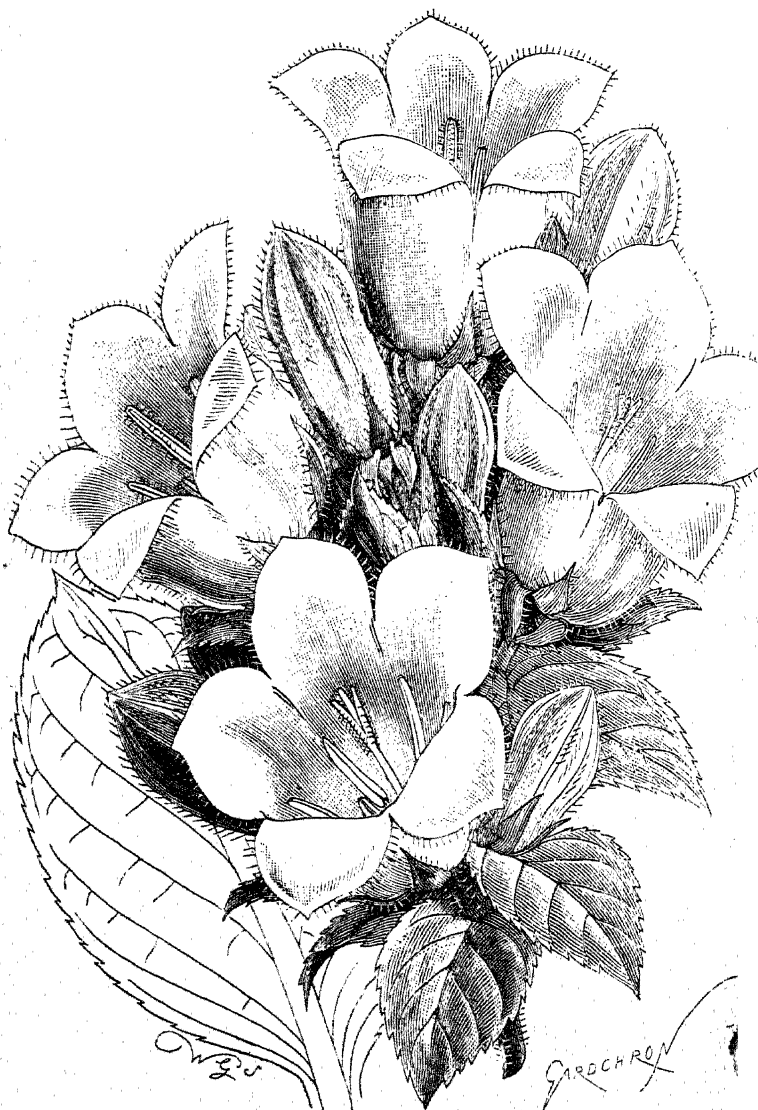


FIG. 41.—*CAMPANULA MIRABILIS*. (*Gardeners' Chronicle*.)

Silver Banksian Medal.

To Mr. Davis, Yeovil, for tuberous Begonias.

To Messrs. Peed, West Norwood, for Carnations.

To Messrs. Paul & Sons, Waltham Cross, for Roses.

To Messrs. Wallace, Colchester, for Lilies, Iris, &c.

To Messrs. Paul & Son, Cheshunt, for Pæonies.

To Messrs. Barr, Covent Garden, for Pæonies and Delphiniums.

To Leopold de Rothschild, Esq., Gunnersbury (gr. Mr. Hudson), for ten varieties of Water Lilies.

Bronze Banksian Medal.

To Messrs. Jackman, Woking, for herbaceous plants.

To Mr. Foster, Brockampton, Havant, for Sweet Peas.

To Messrs. Cannell, Swanley, for Begonias.

First-class Certificate.

To *Lilium Marhan* × (votes, 18 for), from Herr van Tubergen, Jun., Haarlem. Spikes large and well studded with deep brownish orange flowers, spotted with dark brown. This variety is the result of a cross between *Lilium Martagon album* and *L. Hansonii*.

To *Campanula mirabilis* (votes, unanimous), from Messrs. Jackman, Woking. Flowers pale blue or lavender, borne profusely on a dwarf plant with pretty shining green foliage. A new species discovered by M. Alboff in the Caucasus. (Fig. 41.)

Award of Merit.

To *Nasturtium* 'Queen of Tom Thumbs' (votes, 18 for, 1 against), from Messrs. Watkins & Simpson, Long Acre. Flowers deep bronzy red, produced freely on dwarf plants with pretty variegated foliage.

To the strain of *Digitalis purpureo-grandiflora* (votes, 15 for), from Messrs. J. Veitch. Flowers range from purple to pure white, with very large dark brown spots in the throat.

To *Philadelphus Lemoinei* (votes, unanimous), from Messrs. Barr. Flowers pure white, and produced abundantly on long growths of the previous year.

To *Begonia* 'Florence Nightingale' (votes, 9 for, 5 against), from Mr. Davis, Yeovil. Flowers pure white, very double, and of perfect form.

To Begonia 'Thunderer' (votes, 9 for, 6 against), from Mr. Davis. Flowers a rich scarlet, large, and very double.

To Gaillardia 'W. B. Child' (votes, 14 for), from Messrs. Kelway, Langport. Flowers a beautiful yellow or orange, with a dark and pretty disc, borne on long stout stems.

To Lupinus polyphyllus 'Somerset' (votes, 14 for), from Messrs. Kelway. Flowers a soft canary yellow, and produced on spikes of the usual type.

To Iris juncea numidica (votes, unanimous), from Messrs. Wallace. Flowers a beautiful lemon yellow with faint lines of brown; foliage narrow and rush-like.

To Malmaison Carnation 'Mrs. de Satge' (votes, unanimous), from Martin R. Smith, Esq. Flowers large and of a rich scarlet colour.

To Malmaison Carnation 'Lord Welby' (votes, unanimous), from Martin R. Smith, Esq. Flowers very large and deep, and fiery red in colour.

To Malmaison Carnation 'Margot' (votes, unanimous), from Martin R. Smith, Esq. Flowers large, white tinged with soft rose.

To Malmaison Carnation 'Baldwin' (votes, unanimous), from Martin R. Smith, Esq. Flowers of extra large size and substance, and a rich pink colour.

To Rose 'Una' (votes, unanimous), from Messrs. Paul & Son, Cheshunt. Flowers single, very large, and creamy white colour.

To Rose 'Rev. Alan Cheales' (votes, 13 for, 4 against), from Messrs. Paul & Son. Flowers of excellent form and good substance, petals a rich reddish pink.

To Hedysarum multijugum (votes, 14 for), from Sir Trevor Lawrence, Bart., Burford (gr. Mr. Bain). Flowers a rich purple, and produced similar to a Vetch, which it also resembles in the foliage.

To Gladiolus 'Queen of Roses' (votes, unanimous), from Messrs. Sutton, Reading. Flowers a soft rose with deeper markings in the throat.

Other Exhibits.

Messrs. W. Balchin, Hassocks, sent a nice group of Phacelia prolifera Barnsii.

Messrs. Kelway sent a collection of Delphiniums.

Sir Henry Tate, Bart., Streatham (gr. Mr. Howe), sent spikes of *Chamærops Fortunei* from plants grown in the open air.

Messrs. Sutton, Reading, sent a large collection of double Petunias.

G. Yeld, Esq., Clifton Cottage, York, sent flowers of *Hemerocallis* and *Iris*.

Mr. R. Dean, Ealing, sent Pink 'Freedom.'

Mr. Fry, West Malling, sent Fuchsias 'New Life' and 'Hybrida.'

F. G. Lloyd, Esq., Langley, Bucks, sent Begonias.

Mr. Edwards, Box Grove, Guildford, sent Zonal Geranium 'Gertrude.'

Mr. James, Kendal, sent Pyrethrums.

Mr. Green, Acton, sent Petunia 'R. Green.'

Mr. Runcieman, Christchurch, sent a variegated *Antirrhinum* and *Pteris tremula* Ferns.

ORCHID COMMITTEE.

ORCHID COMMITTEE, APRIL 12, 1898.

SYDNEY COURTAULD, Esq., in the Chair, and twelve members present.

Awards Recommended:—

Silver Banksian Medal.

To Major Joicey, Sunningdale (gr. Mr. Fred. J. Thorne), for a group of *Diacrium* (*Epidendrum*) *bicornutum*.

To Jeremiah Colman, Esq., Gatton, Reigate (gr. Mr. King), for a group of Orchids.

To J. Bradshaw, Esq., The Grange, Southgate (gr. Mr. Whiffen), for a group of Orchids.

To Messrs. James Veitch, Chelsea, for a group of Orchids.

First-class Certificate.

To *Eulophiella Peetersiana* (votes, unanimous), from Sir Trevor Lawrence, Bart., Burford (gr. Mr. W. H. White). This giant Orchid was shown for the first time. Flowers large, rose purple. (Fig. 42.)

To *Cypripedium* × 'Olenus,' Burford variety (votes, unanimous), from Sir Trevor Lawrence, Bart. The largest and handsomest of its class. (Fig. 43.)

To *Odontoglossum Wilckeanum*, Pitt's variety (votes, unanimous), from H. T. Pitt, Esq., Stamford Hill (gr. Mr. Aldous). Flowers very large, yellow, with brown blotches. (Fig. 44.)

Award of Merit.

To *Dendrobium* × *Aspasia Langleyensis* (votes, unanimous), from Messrs. James Veitch. Flowers almost wholly yellow.

To *Phalenopsis* × *Stuartiano-Manni* (Manni ♀, *Stuartiana* ♂) (votes, unanimous), from Messrs. James Veitch. Flowers larger than *P. Manni*, cream white, spotted, and marked with brown.

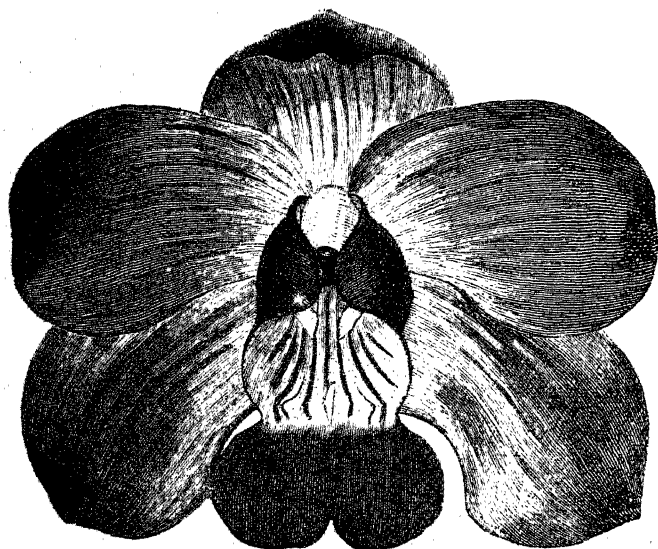


FIG. 42.—*EULOPHIELLA PEETERSIANA*. (*Journal of Horticulture*.)

To *Epidendrum* × *elegantulum leucochilum* (votes, unanimous), from Messrs. James Veitch. Sepals and petals pale yellow, lip white.

To *Odontoglossum crispum Lindenii* (votes, unanimous), from A. Warburton, Esq., Vine House, Haslingden. Flowers white, spotted brown.

To *Phalenopsis* × *Schroderæ* (*leucorrhoda* × *intermedia Portei*) (votes, unanimous), from Messrs. Hugh Low, Clapton,

Flowers bluish white with purple and yellow markings on the lip. (Fig. 45.)

Botanical Certificate.

To *Masdevallia ventricularia longicaudata*, from Sir Trevor



FIG. 43.- *CYPRIPEDIUM* 'OLENUS,' BURFORD VARIETY. (*Journal of Horticulture*.)

Lawrence, Bart. A new section of *Masdevallia* with inflated tube to the perianth. Flowers crimson.

Cultural Commendation.

To Mr. White, gardener to Sir Trevor Lawrence, Bart., for
Cymbidium Devonianum with many spikes.



FIG. 44.—*ODONTOGLOSSUM WILCKEANUM*, PITT'S VARIETY. (*Gardeners Chronicle*.)

Other Exhibits.

Baron Sir H. Schröder (gr. Mr. Ballantine) showed *Odontoglossum crispum Schröderianum* and other *Odontoglossums*.

Sir Trevor Lawrence, Bart., showed a group of rare Orchids.

R. I. Measures, Esq., Camberwell (gr. Mr. Chapman), showed a collection of Orchids.

John Moss, Esq., showed *Odontoglossum Ruckerianum*.

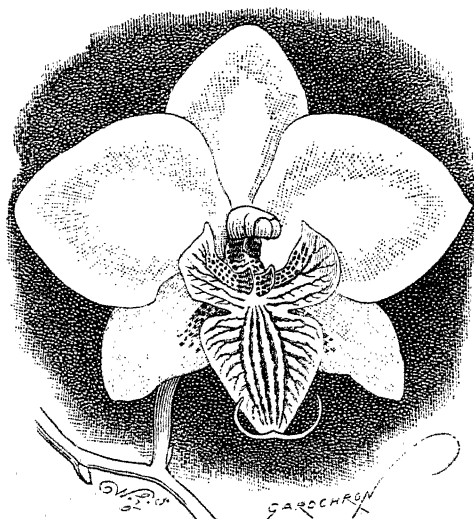


FIG. 45.—*PHALAENOPSIS* × *SCHRÖDERÆ*. (*Gardeners' Chronicle*.)

C. L. N. Ingram, Esq. (gr. Mr. T. W. Bond), showed *Lælio-Cattleya* × 'Sir Wm. Ingram.'

ORCHID COMMITTEE, APRIL 26, 1898.

W. THOMPSON, Esq., in the Chair, and eighteen members present.

Awards Recommended:—

Silver Gilt Flora Medal.

To Messrs. Linden, Brussels, for a collection of *Odontoglossums*.

Silver Banksian Medal.

To Messrs. Jas. Veitch, Chelsea, for a group of Orchids.

To Messrs. Hugh Low, Clapton, for a group of Orchids.

To Messrs. B. S. Williams, Holloway, for a group of Orchids.

First-class Certificate.

To *Lælio-Cattleya* × *Thorntoni* (*C. Gaskelliana* ♀ × *L. Digbyana* ♂) (votes, unanimous), from Messrs. Jas. Veitch, of the same general appearance, and having the fringed labellum as in the other hybrids of its class. (Fig. 46.)

To *Lælio-Cattleya* × *Wellsiana*, var. *Langleyensis* (*C. Trianaei* × *L. purpurata*) (votes, unanimous), from Messrs. Jas. Veitch. (Fig. 47.)

Award of Merit.

To *Odontoglossum Pescatorei* 'Duchess of Westminster' (votes, unanimous), from his Grace the Duke of Westminster, Eaton Hall, Chester (gr. Mr. Barnes). A fine flower handsomely spotted with purple. (Fig. 48.)

To *Cattleya Mendelii* 'Beatrice Ashworth' (votes, unanimous),

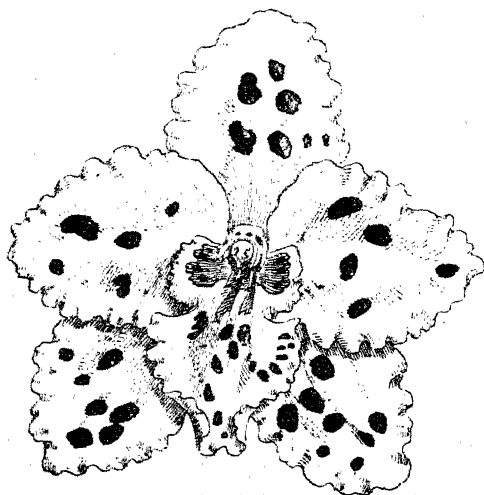


FIG. 48.—*ODONTOGLOSSUM PESCATOREI* 'DUCHESS OF WESTMINSTER.'
(*Journal of Horticulture*.)

from Elijah Ashworth, Esq., Harefield Hall, Wilmslow (gr. Mr. Holbrook). Flowers white with a faint blush tinge.

To *Cattleya Schröderæ*, Harefield Hall variety (votes, unanimous), from Elijah Ashworth, Esq. Flowers very large, of typical colour.

To *Cattleya Schröderæ amabilis* (votes, unanimous), from

Messrs. Jas. Veitch. Flowers very large; lip purplish lilac; throat orange.

To *Cymbidium canaliculatum* (votes, unanimous), from J. Sparks, Esq., Ewhurst. A wholly purple form from Queensland was shown.

To *Odontoglossum Hunnewellianum maximum* (votes, unanimous), from H. Greenwood, Esq., Highfield, Haslingden. A large and dark coloured variety.

To *Cattleya* × *Sedeni* (*Lawrenceana* × *Percivaliana*) (votes, unanimous), from C. L. N. Ingram, Esq., Godalming (gr. Mr. T. W. Bond). Flower resembling *C. Lawrenceana* but larger.

Botanical Certificate.

To *Mormodes ceananthum*, from Sir Trevor Lawrence, Bart., Burford (gr. Mr. W. H. White). The plant bore four fine spikes of claret-coloured flowers.

Cultural Commendation.

To Mr. King, gardener to Jeremiah Colman, Esq., Gatton Park, for *Cattleya Lawrenceana*, with twenty flowers.

To Mr. S. Cooke, gardener to De B. Crawshay, Esq., Sevenoaks, for *Odontoglossum triumphans* 'Lionel Crawshay.'

To Mr. J. Howes, gardener to Walter Cobb, Esq., Tunbridge Wells, for *Cypripedium* × 'Gertrude Hollington.'

Other Exhibits.

The Right Hon. Joseph Chamberlain, Birmingham (gr. Mr. Smith), sent a group of hybrid Orchids raised in his gardens.

J. Bradshaw, Esq., Southgate (gr. Mr. Whiffen), sent a group of Orchids.

Baron Sir H. Schröder, The Dell, Staines (gr. Mr. Ballantine), showed the fine *Odontoglossum triumphans superbum*.

H. T. Pitt, Esq., Stamford Hill (gr. Mr. Aldous), showed a fine *Odontoglossum triumphans*.

F. W. Moore, Esq., Royal Botanic Gardens, Glasnevin Dublin, showed *Neobenthamia gracilis*.

ORCHID COMMITTEE, MAY 10, 1898.

HENRY LITTLE, Esq., in the Chair, and sixteen members present.

Awards Recommended :—

Silver Gilt Flora Medal.

To Messrs. Jas. Veitch, Chelsea, for a group of Orchids.

Silver Banksian Medal.

To Messrs. Hugh Low, Clapton, for a group of Orchids.

First-class Certificate.

To *Spathoglottis* × *aureo-Veillardii* (votes, unanimous), from Messrs. Jas. Veitch. (See vol. xxi. p. xcv.)

To *Lælio-Cattleya* × 'Hippolyta,' Dulcote variety (votes, unanimous), from Walter Cobb, Esq., Dulcote, Tunbridge Wells (gr. Mr. J. Howes). (See vol. xxi. p. xci.)

Award of Merit.

To *Lælio-Cattleya* × 'Fascinator' (*L. purpurata* × *C. Schröderæ*) (votes, 8 for, 2 against), from C. L. N. Ingram, Esq., Godalming (gr. Mr. T. W. Bond). Much like *L.-C.* × 'Aphrodite' (*L. purpurata* × *C. Mendelii*).

Award of Merit.

To *Sophro-Cattleya* × 'George Hardy' (*Sophronitis grandiflora* × *Cattleya Acklandiæ*) (votes, unanimous). A pretty dwarf hybrid with reddish scarlet flowers, from Fred. Hardy, Esq., Tyntesfield, Ashton-on-Mersey (gr. Mr. T. Stafford).

To *Cattleya intermedia*, Fowler's variety (votes, unanimous), from J. Gurney Fowler, Esq., Glebelands, South Woodford (gr. Mr. J. Davis). A large form, bluish-white in colour, with a purplish crimson front to the lip. It bore a general resemblance to a good form of *L.-C.* × *Schilleriana*, but the pollinæ were of typical *Cattleya*.

Botanical Certificate.

To *Epidendrum chitagense*, from F. W. Moore, Esq., Royal Botanic Gardens, Glasnevin. Flowers yellow with purple spots.

Cultural Commendation.

To Mr. F. J. Thorne (gr. to Major Joicey, Sunningdale), for *Anguloa Ruckerii*, with six fine flowers from one growth.

To Mr. R. Johnson (gr. to Thos. Statter, Esq., Stand Hall, Manchester), for *Cypripedium* × *Macrochilum giganteum superbum*.

Other Exhibits.

* Welbore S. Ellis, Esq., Dorking (gr. Mr. Barrell), sent a fine group of *Odontoglossum crispum* and *Miltonia vexillaria*.

Messrs. Linden, Brussels, sent spikes of *Odontoglossums*, &c.

W. G. Soper, Esq., Caterham Valley (gr. Mr. A. Wood), showed *Miltonia vexillaria*.

Reginald Young, Esq., Liverpool, sent *Cypripedium* × 'Belus' (*Harrisianum nigrum* ♀ *Mastersianum* ♂).

Mr. John Robson Rowdon, Cheshire, sent a form of *Odontoglossum* × *Rochfordianum* (*Adrianæ*).

ORCHID COMMITTEE, TEMPLE GARDENS, MAY 25, 1898.

HENRY LITTLE, Esq., in the Chair, and eighteen members present.

Awards Recommended :—

The list of Cups and Medals awarded by the Council will be found on p. lvi.

First-class Certificate.

To *Cattleya Mendelii* 'Oakes Ames' (votes, 9 for, 8 against), from Messrs. Hugh Low, Clapton. Fine in colour, the petals bearing a crimson feather. (Fig. 12.)

To *Odontoglossum* × *Adrianæ venustum* (votes, 10 for, 8 against), from Messrs. Linden, Brussels. A densely spotted hybrid of *O. Hunnewellianum*.

To *Odontoglossum* × *crispum-Harryanum* (votes, 9 for, 4 against), from Mr. C. Vuylsteke, Loochristy, Ghent. A garden hybrid resembling a pale *O. Harryanum*.

To *Lælio-Cattleya* × 'Admiral Dewey' (*C. Warneri formosa* × *L.-C. elegans*) (votes, unanimous), from Messrs. Charlesworth,

Bradford. Flowers large, rose-coloured with purplish crimson lip. (Fig. 50.)

To *Cattleya* × 'Fernand Denis' (*Acklandiæ* × *Warscewiczii*)

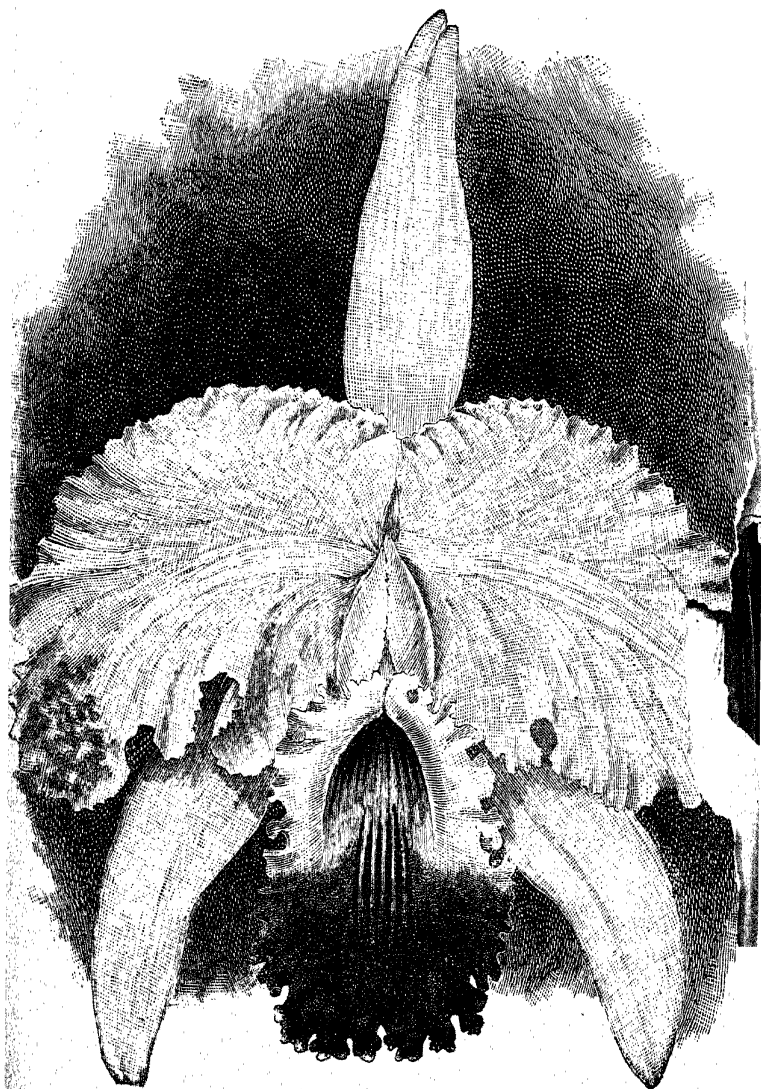


FIG. 43.—*CATTLEYA MENDELII* 'OAKES AMES.' (*Journal of Horticulture*.)

(votes, unanimous), from Messrs. Charlesworth. Habit of *C. Acklandiæ*. Flowers blush-white with rose-coloured freckling and rose crimson lip.

To *Dendrobium Dalhousianum salmoneum* (votes, 10 for, 5 against), from Messrs. Hugh Low. Flowers with the dark blotches on the lip almost suppressed.

Award of Merit.

To *Cattleya Mendelii* 'Amelia' (votes, unanimous), from W. P. Burkinshaw, Hessle (gr. Mr. J. T. Barker). A fine light form.

To *Miltonia* × *Bleuana rosea* (votes, 12 for, 3 against), from M. Jules Hye-Leysen, Ghent.

To *Cattleya Mendelii* 'Mrs. E. V. Low' (votes, 12 for, 2 against), from Messrs. Hugh Low. A fine flower of light colour.

To *Odontoglossum crispum zebrinum* (votes, 9 for, 8 against), from Messrs. Linden, Brussels. A handsomely blotched variety.

To *Odontoglossum Pescatorei bellatulum* (votes, 10 for, 2 against), from Messrs. Linden. Flowers with singular purple blotches.

To *Odontoglossum crispum decorum* (votes, 9 for, 6 against), from Messrs. Linden. A prettily spotted form.

To *Odontoglossum Adrianæ Charlesianum* (votes, unanimous), from M. A. Madoux, Auderghem, Brussels. A form of the *O. Hunnewellianum* hybrid recently shown as *O. Rochfordianum*.

To *Miltonia vexillaria* 'Victoria Augustæ' (votes, unanimous), from Messrs. J. Backhouse, York. Colour rosy crimson.

To *Lælio-Cattleya* × *intermedio-flava* (votes, unanimous), from Messrs. Charlesworth.

Botanical Certificate:

To *Cirrhopetalum Collettii* from Elijah Ashworth, Esq., Wilmslow, Cheshire.

Cultural Commendation.

To Mr. J. Howes, gardener to Walter Cobb, Esq., for *Epidendrum prismatocarpum* with nine spikes.

To Messrs. Charlesworth, for *Cypripedium* × *Schofieldianum*.

To Mr. A. Hislop, gardener to H. S. Leon, Esq., Bletchley rk, for *Oncidium concolor superbum*.

To Mr. W. Stevens, gardener to W. Thompson, Esq., Stone, *Odontoglossums*.

ORCHID COMMITTEE, JUNE 14, 1898.

HARRY J. VEITCH, Esq., in the Chair, and seventeen members present.

Awards Recommended:—

Silver Flora Medal.

To Messrs. Jas. Veitch, Chelsea, for a fine group of Orchids.

To Messrs. Stanley Mobbs & Ashton, Southgate, for a group of Orchids.

Silver Banksian Medal.

To Leopold de Rothschild, Esq., Gunnersbury House (gr. Mr. Jas. Hudson), for a noble specimen of *Lælia purpurata* with thirty-three flowers, grown from a portion of a plant purchased by Mr. Hudson's father in 1861.

To Messrs. Hugh Low, Bush Hill Park, for a plant of *Odontoglossum crispum* named 'Prince of Wales.' The finest of the large white type.

First-class Certificate.

To *Odontoglossum crispum* 'Prince of Wales' (votes, unanimous), from Messrs. Hugh Low. (Figs. 51 and 52.)

To *Lælio-Cattleya* × 'Eudora' (*Aphrodite splendens*) (votes, unanimous), from Messrs. Jas. Veitch. Flowers large; light rose; lip purplish crimson.

To *Lælio-Cattleya* × 'Duke of York' (*L.-C.* × *elegans* × *C.* × *Brymeriana*) (votes, unanimous), from Messrs. F. Sander, St. Albans. Flowers rose-colour; lip rose-purple; in form resembling *Cattleya* × 'Victoria Regina.'

Award of Merit.

To *Lælia purpurata Ernestii* (votes, unanimous), from R. I. Measures, Esq., Camberwell (gr. Mr. H. J. Chapman). Flowers white with a slight yellow shade; lip with narrow chocolate lines and pale rose tint on the disc.

To *Scuticaria Hadwenii* (votes, unanimous), from Sir Frederick Wigan, Bart., Clare Lawn, East Sheen (gr. Mr. W. H. Young). A fine variety with seven flowers was shown.

To *Cattleya Mossiæ Reineckiana* 'Madonna' (votes, 12 for,

3 against), from Messrs. Stanley Mobbs & Ashton, Southgate. A very distinct nearly white form.

To *Odontoglossum* \times *elegantius* 'Baroness Schröder' (votes, unanimous), from Sir Trevor Lawrence, Bart. (gr. Mr. W. H. White). A very prettily marked variety of this natural hybrid of *O. Pescatorei* was shown.

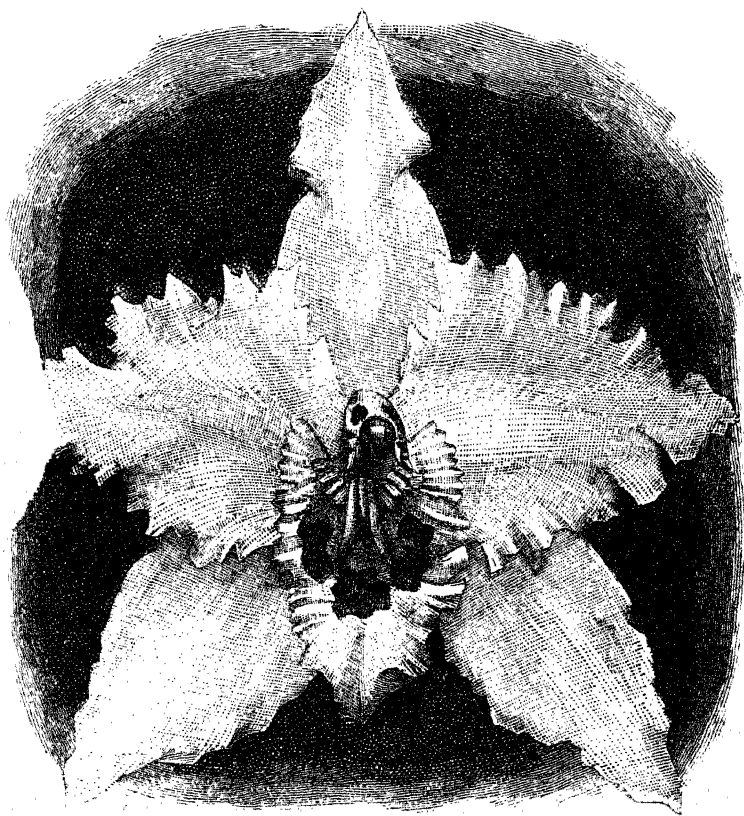


FIG. 52.—*ODONTOGLOSSUM CRISPUM* 'PRINCE OF WALES.' (*Journal of Horticulture*.)

To *Laelio-Cattleya* \times 'Hippolyta aurantiaca' (votes, unanimous), from Messrs. Jas. Veitch. Flowers light orange, with a few purple lines on the lip.

To *Epi-Cattleya* \times *radiato-Bowringiana* (*E. radiatum* \times *C. Bowringiana*) (votes, 9 for, 4 against), from Messrs. Jas. Veitch.

A curious hybrid, with the growth of the *Epidendrum* and flowers in form approaching *Cattleya Bowringiana*. Colour purplish rose. (Fig. 53.)

To *Laelio-Cattleya* \times *Canhamiana* *superba* (votes, unanimous), from Messrs. Jas. Veitch.

Botanical Certificate.

To *Bulbophyllum saltatorium*, from Sir Trevor Lawrence,



FIG. 53.—*EPI-CATTELEYA* \times *RADIATO-BOWRINGIANA*. (*Gardeners' Chronicle*.)

Bart. A curious species with the motile feathery lip, as in *B. barbigerum*.

To *Bulbophyllum Lobbii*, Burford variety, from Sir Trevor Lawrence, Bart. In form as in typical *B. Lobbii*, but the markings rose-colour on cream-white ground.

To *Masdevallia angulata*, Reich., from Mr. Jas. O'Brien, Harrow-on-the-Hill. A fine species of the *M. gargantua* section, never before shown.

Cultural Commendation.

To Mr. W. H. White, gardener to Sir Trevor Lawrence, Bart., for *Dendrobium Bensoniæ*, with thirty-nine flowers on a single stem.

Other Exhibits.

Messrs. Linden, Brussels, exhibited three fine spotted forms of *Odontoglossum crispum*.

De B. Crawshay, Esq., showed *Lælia purpurata*, 'Mrs. De B. Crawshay.'

ORCHID COMMITTEE, June 28, 1898.

HARRY J. VEITCH, Esq., in the Chair, and fourteen members present.

Awards Recommended :—

Silver Flora Medal.

To Messrs. Hugh Low, Clapton, for a group of Orchids.

To Messrs. James Veitch, Chelsea, for a group of Orchids.

Silver Banksian Medal.

To Messrs. B. S. Williams, Holloway, for a group of Orchids.

To Messrs. Stanley Mobbs & Ashton, Southgate, for a group of Orchids.

First-class Certificate.

To *Stanhopea Rodigasiana* (votes, unanimous), from Sir Trevor Lawrence, Bart. (gr. Mr. W. H. White). A noble and distinct new species, with solitary flowers on long decumbent foot-stalks; the flowers six inches across, cream-white, heavily spotted with dark purple. (Fig. 54.)

To *Cypripedium* × *I'Ansonii* (*Rothschildianum* × *Morganii*) (votes, unanimous), from Messrs. Hugh Low. A fine, bold flower, with broad decurved petals of a cream-white, blotched with purple; sepals ivory-white with purple lines; face of the labellum light rose.

To *Cypripedium* × 'Mrs. Reginald Young' (Lowii × *Sanderianum*) (votes, unanimous), from Messrs. Hugh Low. A very distinct hybrid of an Indian yellow colour tinged with red brown, the petals displaying the peculiar undulation as in *C. Sanderianum*.

Award of Merit.

To *Lælio-Cattleya* × *Canhamiana*, var. 'Joyce Wigan' (votes, unanimous), from Sir Frederick Wigan, Bart., Clare Lawn, East Sheen. A large form with the labellum of a rich velvety purple.

To *Cattleya* × *Adela* (*Trianaei* ♀, *Percivaliana* ♂) (votes, 9 for), from Messrs. James Veitch. Flowers large, light-rose, with dark purple lip.

Other Exhibits.

Sir Trevor Lawrence, Bart., showed *Cattleya Warscewiczii* with seven flowers on a spike. Also other interesting Orchids.

Leopold de Rothschild, Esq., Gunnersbury House, Acton (gr. Mr. James Hudson), showed *Mormodes pardinum unicolor*.

W. Gillett, Esq., Fair Oak, Bishopstoke (gr. Mr. Carr), sent a fine form of *Lælia purpurata*.

F. W. Moore, Esq., Royal Botanic Gardens, Glasnevin, Dublin, showed three fine forms of *Masdevallia chimæra*.

F. P. White, Esq., The Willows, Wargrave, Twyford (gr. Mr. W. Pope), showed *Cattleya guttata* with thirty-two flowers on a spike.

Sir Frederick Wigan, Bart., Clare Lawn, East Sheen (gr. Mr. W. H. Young), sent *Sobralia xantholeuca* and other *Sobralias*.

NARCISSUS COMMITTEE.

MARCH 22, 1898.

J. BENNETT-POË, Esq., in the Chair, and nine members present.

Awards Recommended :—

Silver Banksian Medal.

To Messrs. Barr, of Covent Garden, for a group of *Narcissi*.

Bronze Banksian Medal.

To Mr. Ware, of Tottenham, for a group of *Narcissi*.

NARCISSUS COMMITTEE, APRIL 12, 1898.

J. BENNETT-POË, Esq., in the Chair, and nine members present.

Awards Recommended:—

Silver Flora Medal.

To Messrs. Barr, of Covent Garden, for a group of Narcissi.

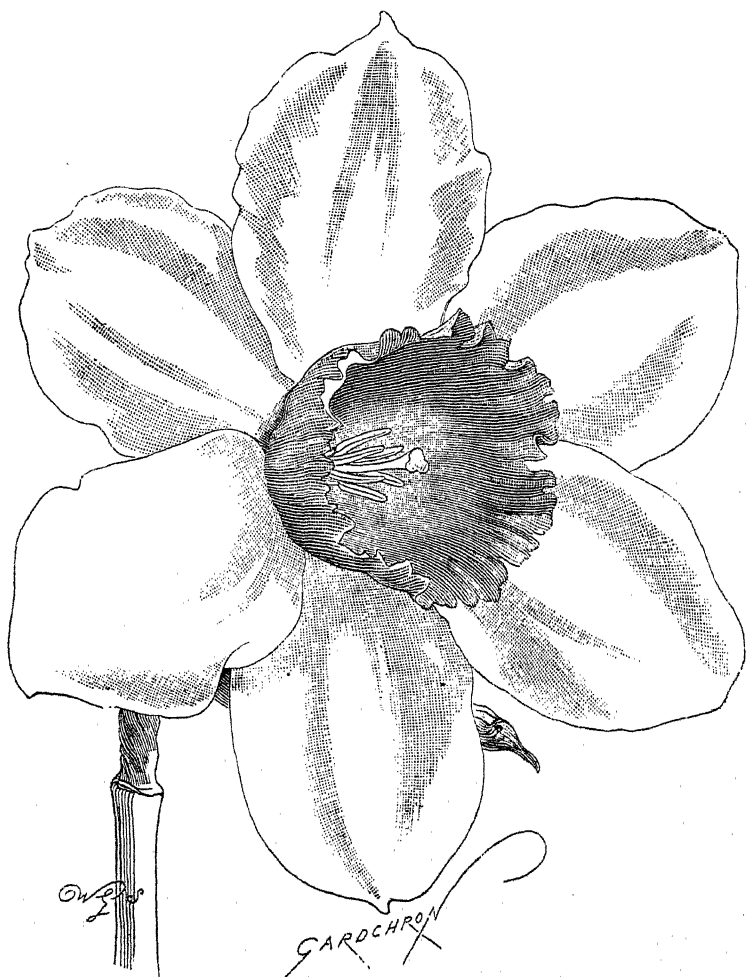


FIG. 55.—NARCISSUS 'LADY MARGARET BOSCAWEN.' (*Gardeners' Chronicle*.)

Silver Banksian Medal.

To Mr. Ware, of Tottenham, for a group of Narcissi.

First-class Certificate.

To Narcissus 'Lady Margaret Boscawen' (votes, 7 for, 1 against), raised and shown by the Rev. G. H. Engleheart. A large and beautiful flower of the Sir Watkin type, but with white segments; very strong and robust. (Fig. 55.)

To Narcissus 'White Queen' (votes, unanimous), from Rev.

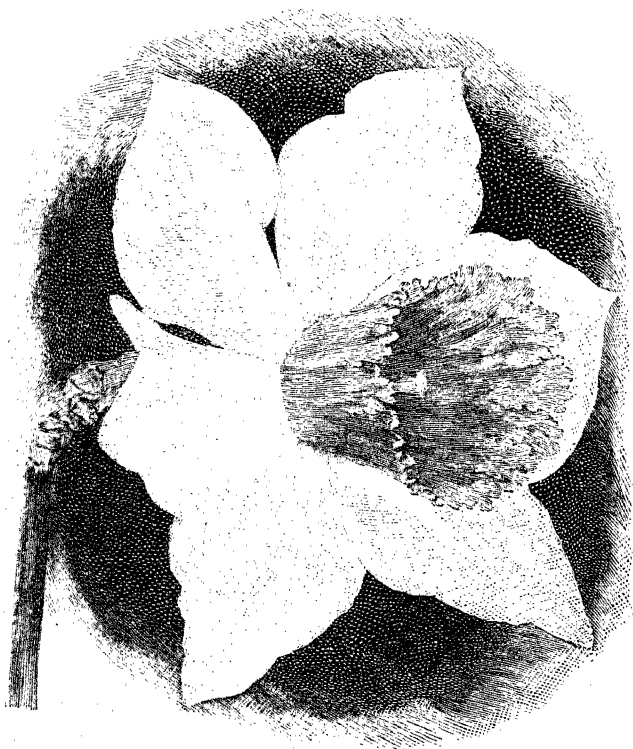


FIG. 56.—NARCISSUS 'WHITE QUEEN.' (*Journal of Horticulture*.)

G. H. Engleheart. Another lovely flower in the way of Sir Watkin, but having the perianth glistening white and the trumpet pale primrose passing to white. (Fig. 56.)

To Narcissus Poeticus 'Homer' (votes, unanimous), from Rev. G. H. Engleheart. The perianth is much larger than in *Ornatus*, and the crown is orange, with a very broad band of clear deep crimson.

Award of Merit.

To Narcissus 'Oriflamme' (votes, unanimous), from Rev. G. H. Engleheart. White perianth of fine circular form, with the entire cup of fiery red.

To Narcissus 'Lucifer' (votes, unanimous), from Rev. G. H. Engleheart. Creamy white segments with a glowing orange-red tubular crown.

To Narcissus 'Lady Helen Vincent' (votes, unanimous), from Messrs. Barr & Sons. Somewhat like Glory of Leyden.

To Narcissus 'Apricot' (votes, unanimous), from Messrs. Barr & Sons. An Ajax with cream-white, narrow divisions, and long narrow trumpet of pale apricot.

NARCISSUS COMMITTEE, APRIL 26, 1898.

J. BENNETT-POË, Esq., in the Chair, and nine other members present.

Awards Recommended:—*Silver Flora Medal.*

To Messrs. Veitch, of Chelsea, for a group of Narcissi.

To Messrs. Barr, of Covent Garden, for a group of Narcissi.

To Messrs. Pearson & Sons, of Chilwell, for a group of Narcissi.

Silver Banksian Medal.

To the Rev. G. H. Engleheart, for a group of Narcissi.

First-class Certificate.

To Narcissus 'Will Scarlett' (votes, unanimous), from Rev. G. H. Engleheart. A magnificent variety, with stout white perianth, and an exceedingly brilliant orange-scarlet cup, very widely expanded. (Fig. 57.)

Award of Merit.

To Narcissus 'Ivanhoe' (8 for, 1 against), from Messrs. Veitch. A small neat flower of the Nelsoni type; perianth clear white, with a very rich orange crown.

To Narcissus 'Diadem' (votes, unanimous), from Rev. G. H.

Engleheart. Creamy-yellow perianth, with a very shallow, broad yellow crown, edged with a sharply defined line of bright red.

To Narcissus 'White Lady' (5 for, 2 against), from the Rev.

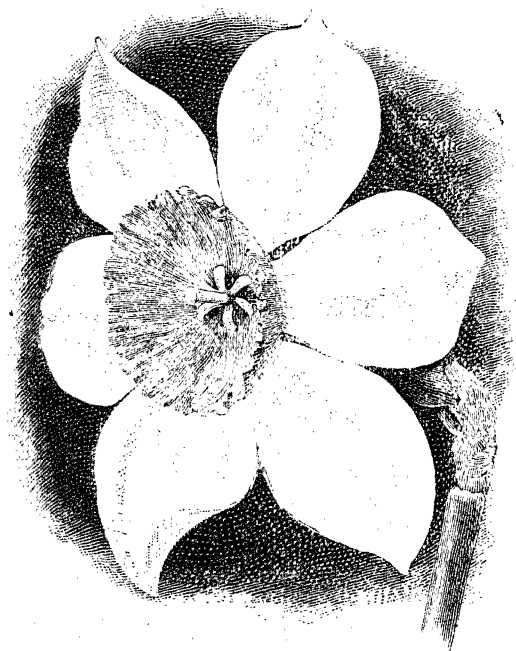


FIG. 57.—NARCISSUS 'WILL SCARLETT.' (*Journal of Horticulture*.)

G. H. Engleheart. Large white perianth, pale yellow crown; an improved Catherine Spurrell.

To Narcissus 'White Wing' (votes, unanimous), from the Rev. G. H. Engleheart. A shapely Nelsoni-like flower; white overlapping perianth segments and stout yellow crown.

EXTRACTS FROM THE PROCEEDINGS

OF THE

ROYAL HORTICULTURAL SOCIETY.

GENERAL MEETING.

JULY 12, 1898.

Mr. A. W. SUTTON, V.M.H., F.L.S., in the Chair.

Fellows elected (21).—Ralph Bankes, J.P., W. Norman Brown, Frank Brunton (United States), C. Buckland, Lady Clonbrock, F. W. Flight, Miss Fowke, F. A. Gardiner, Miss E. Goodhart, Mrs. G. Hammond-Chambers, Harry Hoare, F. H. Holmes, Geo. Kent, Mrs. Nettlefold, F. C. Pilgrim, John Ramsey, Mrs. Sandford, J. T. Strange, E. Trotter, W. Ward, Richard E. West.

A lecture on "Edible Peas" was given by Mr. N. N. Sherwood, V.M.H. (See p. 239.)

GENERAL MEETING.

JULY 26, 1898.

Sir JOHN T. D. LEWELYN, Bart., M.P., in the Chair.

Fellows elected (14).—John Allen, Mrs. Cox, R. G. Fletcher, W. G. Groves, Lady Herbert, Col. Lawrence Heyworth, J.P., H. F. Le Brun, C. Maries (India), Capt. Rogers, Mrs. E. Rowcliffe, E. Sandys-Lumsdaine, Miss Samuells, E. Percy Sugden, A. Taylor.

A lecture on the "Economic Uses of Bamboos" was given by Mr. A. B. Freeman-Mitford, C.B. (See p. 238.)

GENERAL MEETING.

AUGUST 9, 1898.

Mr. JOHN T. BENNETT-POË in the Chair.

Fellows elected (13).—Mrs. A. Bignold, Edward Davis, Mrs. E. Forbes, Charles Fox, William H. Harper, Conway Jones, Charles E. Ladds (United States), Lady Lushington, Frank May, Miss Pascoe, Miss K. Pascoe, John Ryder, Frank Wellesley.

Society affiliated (1).—Newport and County Horticultural Society.

A paper on "Hybrid Water-lilies," by Mons. Latour-Marliac, was read by the Secretary. (See p. 287.)

GENERAL MEETING.

AUGUST 23, 1898.

Mr. GEORGE BUNYARD, V.M.H., in the Chair.

Fellows elected (11).—E. W. Caddick, William Fell, John Hope, Edwin Murrell, Rev. Dacres Olivier, John Seden, B. G. Sinclair, G. S. Titheradge, Jos. Wheatley, J. Wilson, Horace J. Wright.

A lecture on "Perpetual Fruiting Strawberries" was given by Mons. Henry de Vilmorin. (See p. 311.)

GENERAL MEETING.

SEPTEMBER 6, 1898.

Mr. GEO. PAUL, V.M.H., in the Chair.

Fellows elected (11).—Mrs. Boyd, James P. Cross, Rev. H. T. de Salis, Arthur Dicksee, Mrs. C. Dugdale, John English, Frank Grace (South Africa), A. L. Jessopp, Mrs. M. K. Latham, William Talley, Sydney H. Williams.

A paper on "The Disa," by Mr. T. W. Birkinshaw, was read by the Secretary. (See p. 326.)

GENERAL MEETING.

SEPTEMBER 20, 1898.

Mr. JOSEPH CHEAL in the Chair.

Fellows elected (15).—Percy E. Beard, Samuel Bide, R. Brocklebank, J. C. Fordy, John Garner, W. H. Gregory, Mrs. A. Hood, Mrs. M. J. Joyce, F. I. Price, J. Ramsey, W. J. Thompson (Jamaica), Mrs. Saye Thomson, Mrs. C. Tiley, Sir Arthur Wilson, K.C.S.I., R. H. Wilson.

A lecture on "Fruit Growing in Suburban Gardens" was given by Mr. W. Roupell. (See p. 334.)

DEPUTATION TO NEWCASTLE-ON-TYNE.

JULY 3, 1898.

A Deputation of ten Fellows of the Society was appointed by the Council at the invitation of the Executive of the Durham, Northumberland, and Newcastle-on-Tyne Botanical and Horticultural Society to visit their great Summer Show, held on the North Road Recreation Ground, Newcastle.

The Deputation consisted of—

Sir TREVOR LAWRENCE, Bart., President R.H.S.

PHILIP CROWLEY, Esq., F.L.S., F.Z.S., Treasurer R.H.S.

CHARLES E. SHEA, Esq., Member of Council.

THOMAS STATTER, Esq., Member of Council.

HARRY J. VEITCH, Esq., F.L.S., Member of Council.

Mr. JAMES O'BRIEN, V.M.H., Secretary Orchid Committee.

Mr. GEORGE PAUL, V.M.H., Member Floral Committee.

Mr. A. H. PEARSON, Member Fruit Committee.

Mr. JOHN WRIGHT, V.M.H., Member Fruit Committee.

Rev. W. WILKS, M.A., Secretary R.H.S.

The Deputation left King's Cross at 2.20 P.M. on Tuesday, July 12, and arrived at Newcastle at 8.45, being received at the station by Mr. Riley Lord, J.P., President; Mr. Alderman J. Baxter Ellis, J.P., Chairman of the Council; Mr. J. J. Gillespie, M.A., Secretary of the Society; and many members of the Society's Council,

They were at once conducted to the Station Hotel, where they found most comfortable quarters had been provided for them by the Secretary, Mr. J. J. Gillespie, Jun. A magnificent banquet was also awaiting them, which was presided over by Mr. Riley Lord, President, supported by Mr. Philip Crowley, Treasurer R.H.S.; Alderman J. Baxter Ellis, J.P.; Mr. Ben. Plummer, Vice-Chairman of the Council; Rev. W. Wilks, M.A., Secretary R.H.S., the Judges of the Show, the remainder of the Deputation, Members of the City Council, and the Council of the Society.

At 9.30 on Wednesday morning carriages were in readiness to convey the Deputation to the Show Ground, which was reached about a quarter before 10 o'clock, and at 10 o'clock precisely they were able to commence their inspection.

After the Deputation had finished their work and made their awards, they were (together with the Judges of the Show) entertained at luncheon at 1.30 P.M. at the Grand Hotel, under the presidency of Riley Lord, Esq., J.P., of Highfield Hall, Gosforth, who was supported by Mr. Alderman J. Baxter Ellis, J.P.; the Deputy-Mayor (Councillor R. L. Dunford, J.P.); Councillor J. A. Baty, Councillor J. J. Gillespie, J.P.; Councillor Thomas Cooke, J.P., and many others.

Most of the Deputation remained in Newcastle till Thursday, but some left the city the same afternoon, carrying with them very lively recollections of the courtesy and hospitality of the citizens of Newcastle.

Awards at Newcastle.

Gold Medal.

To Messrs. J. Veitch, Chelsea, for a group of plants.

Silver Gilt Flora Medal.

To Messrs. W. Paul for a group of Roses.

To Messrs. James Backhouse & Co. for a group of Alpines.

To Messrs. Forbes, Hawick, for Phloxes, Pentstemons, and Delphiniums.

Silver Gilt Banksian Medal.

To Messrs. Wallace, Colchester, for Lilies

Silver Flora Medal.

- To Messrs. Cocker, Aberdeen, for hardy herbaceous plants.
- To Messrs. Cocker for English and Spanish Irises.
- To Messrs. Cannell, Swanley, for a group of Cannas.
- To Messrs. Perkins, Coventry, for Roses arranged for effect.

Silver Banksian Medal.

- To Mr. Alexander Lister, Rothesay, for Violas.
- To Leopold de Rothschild, Esq. (gr. Mr. J. Hudson, V.M.H.),
for Water-lilies.
- To Messrs. Harkness, Bedale, for Roses.
- To Sir Joseph Pease, Bart.; M.P. (gr. Mr. McIndoe, V.M.H.),
for fruit.
- To the Earl of Harrington, Derby (gr. Mr. Goodacre), for
fruit.
- To Mr. Septimus Pye, Garstang, for Violas.

Bronze Flora Medal.

- To Messrs. Harkness, Bedale, for hardy plants.

First-class Certificate.

- To Ilex Aquifolium Hodginsi 'Golden King,' from Messrs.
Little & Ballantyne, Carlisle. (See page lxxxii.)

SCIENTIFIC COMMITTEE.

JULY 26, 1898.

Dr. M. T. MASTERS, F.R.S., in the Chair.

Present: Mr. Bennett-Poë, Dr. Russell, F.R.S., Mr. Veitch,
Rev. George Henslow, V.M.H., Hon. Sec.

Tomatos and Sleepy Disease.—Plants suffering from this now not uncommon complaint were forwarded to Dr. William G. Smith for examination. He reports as follows:—"My observations agree with those of Mr. Massee given in the *Gardeners' Chronicle*, June 8, 1895. I have already seen several cases of this disease this season. I do not see an easy way of getting rid of the fungus. Mr. Massee's suggestion of liming the soil seems a good one, but I have had no experience."

Outgrowths on Potatos.—Mr. Sutton sent some tubers having curious excrescences upon them, received from Mr. Kerr, of Dumfries. They were reserved for examination.

Asters Diseased.—Mr. W. P. Wright, of Fairview, Willesborough, Ashford, Kent, sent some specimens, and observes that "Growers of Asters in East Kent, especially in the Dover district, are in trouble over an Aster disease which destroys thousands of plants. Some go off directly they are put out, others at a later stage. I found small white grubs in the lower part of the stems, and I do not feel any doubt that they are the cause of the mischief." In the *Naturalist*, the organ of the Yorkshire Naturalists' Union, there is a paper by Rev. Hilderic Friend on this subject. The worms in question are of the family of Enchytraidæ, a group of annelids. Mr. Friend discovered a presumably new form in China Asters, and named it *E. parvulus* on account of its minuteness. A full description of the worm is given in Mr. Friend's paper. There is nothing to be done but consign the plants attacked to the flames. An account of the Aster worm will be found in the *Gardeners' Chronicle* for August 14, 1897, p. 89, with figure.

Melons with Seeds Germinating.—Mr. Veitch read a letter from Mr. A. McKellar, gardener to H.R.H. the Prince of Wales, Sandringham, describing a Melon sent to Marlborough House which was full of young Melon plants, quite green. They were plunging their roots into the pulp, and feeding upon it. Similar growths have often been seen in Lemons and Oranges, as well as Cucumbers, Pumpkins, Papaws, and other fleshy fruits. The cause appears to be that the fruit has been kept some time in a warm atmosphere.

SCIENTIFIC COMMITTEE, AUGUST 9, 1898.

Dr. M. T. MASTERS, F.R.S., in the Chair.

Present: Mr. Bennett-Poë, Rev. W. Wilks, Mr. Marshall, Rev. Prof. Henslow, V.M.H., Hon. Sec., and the following visitors:—Prof. J. Bailey, of Cornell University, Ithaca, N.Y., Herr J. K. Budde, Curator of the Botanical Gardens, Utrecht; and Mr. Gordon, V.M.H.

Tomato with Red and Yellow Fruit.—Mr. J. McLean, Luttrellstown, Clonsilla, Co. Dublin, sent some golden-yellow

fruit, with the following observations:—"The plant which produced them is one out of 145 'Frogmore (red) selected.' The first cluster produced the true red variety, but on the same plant three trusses consisted of yellow fruit, as sent." Prof. Bailey observed that he had raised yellow-fruited Tomatos from the seed of red-fruited plants, but had not seen a case resembling the present one in America, though he had known a cutting of a red-fruited variety to bear yellow fruit, as well as a red fruit being striped with yellow.



FIG. 76.—DIMORPHIC VAR. OF *SCOLOPENDRIUM VULGARE*. (*Gardeners' Chronicle*.)

Scolopendrium var.—Mr. Marshall exhibited a plant raised from a frond which was remarkable for its great size, being quite a foot broad, and terminated with numerous barren subdivisions. This frond was buried, leaving the terminal subdivisions only exposed. Roots were formed at the bases of some of the subdivisions, so that five plants were raised. Of these two repeated the remarkably broad fronds, two reverted to the wild form, and

the one exhibited bore four fronds with digitate extremities, one frond with a crisped margin (var. *crispum*), and one frond as flat as in the wild state. (Fig. 76.)

Tomatos with Supernumerary Carpels.—Dr. Bonavia sent two specimens, one consisting of four carpels, which, instead of being coherent to form a single fruit, were only united at the base, and therefore nearly apocarpous; the other had several extra carpels issuing out of the centre above. These formed a whorl of carpels in addition to the normal series. It resembled the ‘Mellarose Orange’ in this respect.

Poppyhead with Pistillody of the Stamens.—Herr J. K. Budde exhibited a fruit of *Papaver somniferum* with a complete whorl of miniature carpels around the base, these being metamorphosed stamens. This peculiarity is well known; but it is interesting to hear that Prof. de Vries has succeeded in fixing it by selection, so that this monstrosity now comes true from seed. A similar phenomenon is common among Wallflowers. With reference to hereditary monstrosities, Prof. Bailey observed that a species of *Echinops* with a fasciated and twisted stem, as also the spirally twisted variety of the Fuller’s Teazle, can be now perpetuated from seed. Prof. Henslow inquired if the Weeping Ash was known to be perpetuated by seed, as of thousands of seedlings in his garden at Ealing none ever showed any inclination to weep, though the late Prof. J. S. Henslow found a slight tendency to weep to exist for two or three years in his experiments at Hitcham; but the plants grew erect afterwards. Mr. Wilks observed, on the other hand, that out of multitudes of chance seedlings one young tree a few years old, at Shirley, had begun to show a tendency to weep.

Crassulaceous Hybrid.—Mr. Veitch sent trusses of flowers, of a new hybrid, raised by Mr. Seden, between *Kalosanthes coccinea* ♀ and *Rochea falcata* ♂. The flowers of the hybrid were small, as in the female parent, but the colour approached that of the male. In many points it was intermediate between the two parents.

Cattleya granulosa, Dimerous.—Dr. Masters exhibited, on the part of Mr. Cobb, a blossom with its parts in twos, there being two large sepals, two lips, &c.—not a rare phenomenon in ordinarily trimerous flowers, as Iris, &c.

Hybrid Nymphæas.—Dr. Masters exhibited several varieties,

as shown in the Drill Hall by Mr. Hudson, Mr. Freeman Mitford, C.B., and others, with the purpose of calling attention to the different arrangements and numbers of the air-canals in the stems of the flowers and in the petioles. He observed that the *Nymphæas* could be grouped by means of them.

Plymouth Strawberry.—A specimen was received from Mr. J. Arrowsmith, of Bank Road, Glazebrook, Manchester. It is a monstrous condition of the ordinary fruit, in which some of the achenes are replaced by leaves, as in the well-known Alpine Strawberry, of which the present case is a variety. It was described by Ray, who gave the name, having received it from Plymouth. It resembles the green Rose in thus having its floral organs more or less in a state of reversion to leaves.

Strawberry Plants defective.—Some plants were received from Mr. J. Lyne, of The Gardens, Foxbury, Chislehurst, in which the crowns were generally blind. The variety is Royal Sovereign. Mr. Lyne writes :—"Last autumn we planted a bed of last season's runners, with the object of getting early runners this year. They grew well, and made a fine lot of early runners. All trusses of bloom were picked off the parent plants as soon as they appeared. The runners were layered, four in a 6-inch pot, and all rooted well; but last week, when transferring them into single pots, we found about half were blind, the crowns being brown within. A healthy plant would be often growing in the same pot with defective ones." Perhaps some growers of Strawberries may have had a similar experience, and can throw some light on the mystery. Sections of the crown buds revealed no visible fungi nor insects, but the scales were turning brown from the exterior part inwards—apparently suggestive of an external source of the mischief.

FRUIT AND VEGETABLE COMMITTEE.

JULY 5, 1898.

AT CHISWICK.

PH. CROWLEY, Esq., in the Chair, and twenty-two members
present.

The Committee inspected the Peas, Strawberries, and
Lettuces growing in the Gardens. (See page 204 *et seq.*)

Awards Recommended:—*Award of Merit.*

To Pea 'Thomas Laxton' (votes, unanimous), from Messrs.
Laxton, Bedford.

To Pea 'Drummond's New' (votes, 6 for, 4 against), from
Mr. Drummond.

To Pea 'Veitch's Acmé' (votes, unanimous), from Messrs.
J. Veitch, Chelsea.

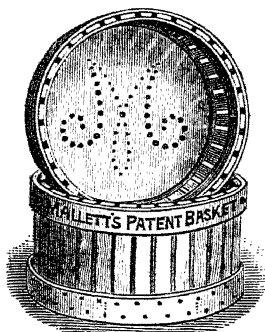


FIG. 77.—THE MALLETT BASKET.

To Strawberry 'Reward' (votes, 8 for, 5 against), from
Messrs. Laxton.

To Lettuce 'Crystal Palace' (votes, unanimous), from
Messrs. Watkins & Simpson, Strand.

Other Exhibits.

The Mallett Basket Company sent specimens of their baskets.

The "points" of this basket are said to be that they are perfectly sound, stand clear of the ground, perforated all over, and hold the exact quantity stated. (Fig. 77.) Mr. Wright was desired to try them at Chiswick and report.

Messrs. Laxton sent Strawberries 'Thomas Laxton' and 'Mentmore.'

FRUIT AND VEGETABLE COMMITTEE, JULY 12, 1898.

GEO. BUNYARD, Esq., in the Chair, and eight members present.

Awards Recommended:—

Silver Gilt Knightian Medal.

To Her Majesty the Queen (gr. Mr. Owen Thomas), Windsor, for a collection of Strawberries, Cherries, Peaches, and Nectarines.

Silver Knightian Medal.

To Messrs. J. Veitch, Chelsea, for Strawberries, Cherries, and Cherry-trees in pots.

Silver Banksian Medal.

To Messrs. Carter, Holborn, for a collection of Peas.

Bronze Banksian Medal.

To Miss Ridge, Highfield, Staines (gr. Mr. G. Lane), for six bunches of Black Hambro Grapes. Very fine in berry and well coloured.

First-class Certificate.

To Strawberry 'Veitch's Prolific' (votes, unanimous), from Messrs. J. Veitch. This variety is the result of crossing 'Empress of India' ♀ with 'British Queen' ♂. The berries are large, wedge-shaped, bright red in colour, with firm flesh and a rich, delicious flavour. (Fig. 78.)

To Cucumber 'Sensation' (votes, unanimous), from Mr. S. Mortimer, Farnham. The fruits are smooth, of medium size, perfect form, with a remarkably small neck, and of a deep green colour.

Cultural Commendation.

To Messrs. Cannell, Swanley, for Peas.

Other Exhibits.

Sir Trevor Lawrence, Dorking (gr. Mr. Bain), sent a fine dish of Peach 'Royal Charlotte.'

The Maharajah of Gwalior, India (Supt. Mr. Maries, V.M.H.), sent a collection of dried Vegetables. These are used during the rainy season in North-west India when vegetables are scarce.

Messrs. J. Veitch sent Strawberry 'Exquisite,' raised by crossing 'Lord Suffield' ♀ and 'King of the Earlies' ♂. A medium-sized berry of good flavour.

Her Majesty the Queen (gr. Mr. Owen Thomas) sent Melon 'Cambrian' and Strawberry 'Duke of Connaught.'

Messrs. Laxton, Bedford, sent Strawberries 'Fillbasket' and 'Mentmore.' Also Pea 'Thomas Laxton.'

Col. Platt, C.B., Gorddinog, Llanfairfechan (gr. Mr. W.

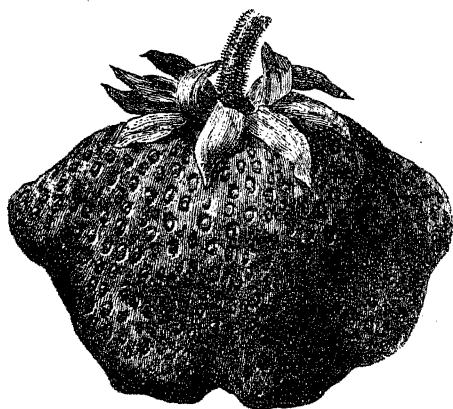


FIG. 78.—STRAWBERRY 'VEITCH'S PROLIFIC.' (*Journal of Horticulture*.)

Coates), again sent Melon 'Gorddinog Seedling,' but it was over ripe.

Messrs. Kelway, Langport, sent fruits of 'The Logan Berry.'

Mr. Henry Eckford, Wem, sent six new Peas.

Lord Windsor, Hewell Grange, Redditch (gr. Mr. W. K. Pettigrew), sent Melon 'Lady Paget.'

FRUIT AND VEGETABLE COMMITTEE, JULY 22, 1898.

AT CHISWICK.

H. BALDERSON, Esq., in the Chair, and six members present.

The Committee inspected the Potatos, Turnips, Lettuces and Peas growing in the Gardens. (See page 224 *et seq.*)

Awards Recommended :—*Award of Merit.*

To Turnip 'New Model' (votes, unanimous), a fine stock of 'Snowball.'

To Pea 'The Bruce' (votes, unanimous), from Mr. Eckford, Wem.

To Pea 'The Prior' (votes, unanimous), from Mr. Eckford.

To Pea 'Saccharine' (votes, unanimous), from Mr. Sim.

To Pea 'Honeydew' (votes, unanimous), from Mr. Sim.

To Pea 'Continuity' (votes, unanimous), from Messrs. Sutton, Reading.

To Pea 'Hertford Success' (votes, unanimous), from Messrs. Nutting.

To Pea 'Mansfield Show' (votes, unanimous), from Messrs. Wright.

Other Exhibits.

Messrs. Rivers, of Sawbridgeworth, sent Potato 'Rivers's Royal Ashleaf,' which on being cooked proved of excellent quality.

* * NOTE.—The number of members present being insufficient to form a quorum, the above recommendations were all passed subject to their being confirmed at the next meeting, which was done.

FRUIT AND VEGETABLE COMMITTEE, JULY 26, 1898.

PHILIP CROWLEY, Esq., in the Chair, and nineteen members present.

Awards Recommended :—*Silver Gilt Knightian Medal.*

To Messrs. J. Veitch, Chelsea, for a collection of Fruits.

Silver Banksian Medal.

To Messrs. Rivers, Sawbridgeworth, for a collection of Cherries and Plums.

To Messrs. Johnson, Boston, for a collection of Peas.

First-class Certificate.

To Cherry 'Early Rivers' (votes, unanimous), from Messrs. Rivers. Fruit large, deep black, and of delicious flavour. It was said to have received a certificate in 1872, but no record of it could be found. The finest early Cherry for general use.

To Plum 'Early Transparent' (votes, unanimous), from Messrs. Rivers. Fruit of medium size, round, golden yellow, and flushed with red on the exposed side; flesh very melting and of superb flavour.

To Lettuce 'Crystal Palace' (votes, unanimous), from Messrs. Watkins & Simpson, Strand. (See page 226.)

Award of Merit.

To Strawberry 'Lady Suffield' (votes, 11 for, 5 against), from Lord Suffield, Gunton Park, Norwich (gr. Mr. W. Allan). Fruit large, wedge-shaped, dark in colour, and flesh firm, and of a rich refreshing flavour.

To Raspberry 'Golden Queen' (votes, 14 for, 2 against), from Messrs. J. Veitch, Chelsea. Fruit large, bright yellow, and of sweet pleasant flavour. This is a curious result of crossing Raspberry 'Superlative' ♀ with *Rubus laciniatus* ♂, the former red and the latter dark fruited. The trusses of fruit resemble 'Superlative' for size, and the growth of the seedling is thickly studded with spines, as in the *R. laciniatus*. The foliage is also in three divisions instead of five as in the ordinary Raspberry.

Other Exhibits.

Lord Suffield (gr. Mr. Allan) sent Melon 'Gunton Scarlet,' a deep scarlet-fleshed variety of good flavour.

From W. Carmichael, Esq., Edinburgh, came Strawberries 'Richard Gilbert,' 'Queen of Denmark,' 'Princess of Wales,' and 'Britannia.' 'Queen of Denmark' was considered a variety of great promise.

The Duke of Rutland, Belvoir Castle (gr. Mr. W. Divers), sent Strawberries 'Waterloo,' 'Gunton Park,' and 'Dr. Hogg.'

Mr. Eckford, Wem, sent Peas 'Consummate,' 'Heroine,'

'Wem,' 'Rex,' 'Monarch,' and 'Philip Crowley,' which the Committee requested to be tried at Chiswick.

From Mr. R. Maher, Yattendon Court, Newbury, came Raspberry 'Old Gold.' It was impossible to express any opinion, as the fruit was smashed in transit.

Mr. Becker, Jersey, sent Currant 'The Comet,' and Gooseberry 'Trouville Giant.' It was suggested that 'Comet' was synonymous with 'La Versaillaise.'

Messrs. Laxton, Bedford, sent Strawberries 'Fillbasket' and 'Trafalgar.'

Her Majesty the Queen (gr. Mr. O. Thomas) sent some splendid fruits of Melon 'Lord Edward Cavendish.'

C. Bayer, Esq., Forest Hill (gr. Mr. W. Taylor), sent Nectarine 'Pine Apple,' grown on pot trees.

From the Society's Gardens were sent Lettuces, Turnips, and Peas, for which awards had been recommended at Chiswick on July 22, and the awards were now all confirmed. (See pages 226, 204, &c.)

FRUIT AND VEGETABLE COMMITTEE, AUGUST 9, 1898.

PHILIP CROWLEY, Esq., in the Chair, and seventeen members present.

Awards Recommended :—

Gold Medal.

To Messrs. J. Veitch, of Chelsea, for a collection of Gooseberries, Currants, Cherries, Apples and Pears.

Silver Gilt Knightian Medal.

To Mrs. Abbott (gr. Mr. Kelf), Regent's Park, for a collection of fruit grown in London.

Silver Knightian Medal.

To Lord Foley (gr. Mr. Miller), Esher, for a collection of fruit.

Silver Banksian Medal.

To Messrs. Rivers, Sawbridgeworth, for boxes of Plums, Cherries, and Nectarines.

Other Exhibits.

Mr. W. Carmichael, Edinburgh, sent Strawberry 'Britannia.' As sent it was a very ugly fruit owing to the extraordinary abundance and prominence of the dingy yellow seeds; the flavour was good, but the berries small. The Committee again expressed an opinion that Mr. Carmichael's seedling Strawberries must be grown in the South of England before they can possibly receive full justice, the climate of Edinburgh being unsuitable for their full development.

From the Society's Garden at Chiswick came five varieties of French Beans.

Mr. Amies, Ashford, Kent, sent Scarlet Runner Beans.

Messrs. Kelway, Langport, sent under name 'The Strawberry-Raspberry' a species of *Rubus* believed to be indigenous to Japan; it is very pretty, like an *Arbutus* berry; juicy, but with no flavour. It is not a hybrid, as the English name suggests, but a true species, *Rubus palmatus*.

Messrs. J. Veitch, Chelsea, sent a hybrid Raspberry-Blackberry (Raspberry 'Belle de Fontenay' \times Blackberry ordinary variety). An award of merit was proposed for it but not carried. In appearance it is like a very large red-violet Blackberry, and the foliage is almost exactly midway between the two parents. The flavour is that of a very juicy and very sour raspberry. It would probably cook splendidly; and ripening after Raspberries and before Blackberries will probably be itself useful or prove the forerunner of other similar hybrids of greater merit. Unlike either parent the fruit adheres firmly to its base, and it will therefore prove a very difficult subject to gather.

Messrs. Harrison, of Leicester, sent a most interesting collection of twenty varieties of Broad Beans.

W. H. Evans, Esq. (gr. Mr. Crook), Forde Abbey, sent a new Melon 'Forde Abbey Seedling.'

Mr. Roupell, Roupell Park, sent Apples 'Mr. Gladstone' and 'Irish Peach,' showing that the former was ten days earlier than the latter.

Lord Onslow (gr. Mr. Blake) sent Red Currant 'La Versailles' to show its identity with 'The Comet.'

Mr. A. Dean sent Turnip 'Snowball' to show its great similarity to 'New Model.'

Sir Weeman Pearson, Bart. (gr. Mr. Capp), sent a Melon

(‘William Tillery’ × ‘Monroe’s Little Heath’) called ‘Capp’s Seedling.’

FRUIT AND VEGETABLE COMMITTEE, AUGUST 23, 1898.

H. BALDERSON, Esq., in the Chair, and nine members present.

Awards Recommended :—

Silver Gilt Knightian Medal.

To Messrs. Bunyard, of Maidstone, for a collection of Fruit.

Silver Banksian Medal.

To the Dowager Lady Freake, Fulwell Park (gr. Mr. Rickwood), for a collection of Fruit.

To Messrs. Rivers, of Sawbridgeworth, for a collection of Fruit.

Award of Merit.

To Apple ‘Langley Pippin’ (votes, unanimous), from Messrs. James Veitch, Chelsea. A hybrid from ‘Gladstone’ × ‘Cox’s Orange,’ and partaking of the character of both parents. Like ‘Gladstone,’ early, ribbed (slightly), and acid ; like ‘Cox’s Orange’ in general shape, stalk, eye (exactly), and delicious flavour.

To Tomato ‘Red Currant’ as a dessert and decorative variety (votes, unanimous), from the Society’s Gardens. A nice and exceedingly pretty fruit, borne in strings like rather large red currants.

Cultural Commendation.

To Mr. Miller, Gardener to Lord Foley, Ruxley Lodge, for dishes of very fine Figs and Peaches.

To Mr. J. Hudson, Gardener to Leopold de Rothschild, Esq., for a grand box of ‘Royal Sovereign’ Strawberries, from plants which had been forced in the early spring and then planted out after the forced crop had been gathered.

To Messrs. James Veitch, of Chelsea, for a specimen of *Rubus Phonicolasius* or Japan Wineberry. The plant, stood fully 8 feet high and 4 feet through ; it was a mass of fruiting sprays from top to bottom. The fruit, though doubtless making good jam, is not of much value, otherwise than from an ornamental point of view.

To Messrs. Harrison, of Leicester, for very fine fruiting sprays of *Rubus palmatus* (the so-called Strawberry-Raspberry). This, too, is an ornamental fruited plant, but the fruit (like a large Arbutus berry) is of no value whatever save for decoration. It is a true species of *Rubus*, and not, as at first suggested, a hybrid between the Strawberry and the Raspberry.

Other Exhibits.

A. Pipon, Esq., Farningham, sent Tomato 'Beauty of Sark.'

Messrs. Bunyard sent Pear 'Rivers's Beacon;' Nut 'Prolific or Frizzled Filbert;' Strawberry 'St. Joseph;' Apple 'Emperor Napoleon,' a very highly coloured but ugly rough ribbed fruit; and Peaches 'Dymond' and 'Goshawk.'

Mr. J. C. Prowse sent an Apple (somewhat resembling the 'Strawberry Apple') which he had raised from a pip of an American fruit.

Alex. Henderson, Esq., M.P., Buscot Park (gr. Mr. Bastin), sent a seedling Melon.

C. Springham, Esq., Big Snap, sent Apple 'Gladstone.'

Messrs. Laxton, of Bedford, sent Strawberry 'St. Joseph' (see p. 322) and 'Laxton's Perpetual;' the latter is a seedling from 'James Veitch' x 'Dr. Hogg,' and was the only plant amongst a large number raised which developed the peculiar character of fruiting in late summer and autumn on the runners of the current year; each runner throwing up a truss of blossom even before it begins to root. Messrs. Laxton also sent small plants of *Rubus palmatus*.

Messrs. Cannell, of Swanley, sent growing plants of Strawberries 'St. Joseph' and 'Louis Gautier,' the latter having the same peculiarity of bearing on the runners described under 'Laxton's Perpetual.'

Leopold de Rothschild, Esq. (gr. Mr. Hudson), Gunnersbury, sent fine boxes of Alpine Strawberries 'Rouge amélioré' and 'Belle de Meaux' (see p. 317, Fig. 71).

Mrs. Abbott (gr. Mr. Kelf), Regent's Park, sent some fine fruits of Peach 'Sea Eagle.'

The Duke of Sutherland (gr. Mr. Blair) sent a very curious silver variegated leaved spray of a Nectarine, with a fruit showing distinct whitened patches on the skin.

Mr. Wm. Culverwell sent a specimen of his hybrid between

the Black Currant and the Gooseberry. The fruits are like very small deep red Gooseberries, but have a most decided Black Currant flavour; the growth of the bush, though thornless, is like the Gooseberry, whilst the leaves have the Black Currant smell.

FRUIT AND VEGETABLE COMMITTEE, AT CHISWICK,

AUGUST 30, 1898.

Rev. W. WILKS, M.A., in the Chair, and seven members present.

The Committee inspected 69 stocks of Onions, 9 stocks of Beet, 34 stocks of Tomatos, a Canadian Clover, a new Shallot, a new Melon, and 49 stocks of Potatos, of which thirteen varieties were so good in appearance and heavy cropping, that the Committee ordered some of each to be cooked, viz. :—

A 1.	Leader.
Challenge.	Miss Ellen Terry.
Devonian.	New Main Crop.
Fidler's Queen.	Palmeira.
Fishtoft Seedling.	Sir Walter Raleigh.
Ideal.	The Major.
Ivo.	

Awards Recommended :—

Highly Commended. (See page 221 *et seq.*)

Onion 'Banbury Cross' (votes, unanimous), grown from seeds sent by Messrs. Nutting, Suffolk Street, S.E., and Messrs. Hurst, Houndsditch.

Onion 'Nuneham Park' (votes, unanimous), grown from seeds sent by Messrs. Nutting.

Onion 'Wroxton' (votes, unanimous), grown from seeds sent by Messrs. Watkins & Simpson, Exeter Street, W.C.

Onion 'Rousham Park' (votes, unanimous), grown from seeds sent by Messrs. Watkins & Simpson.

Beet 'Red Globe' (votes, unanimous), grown from seeds sent by Messrs. Watkins & Simpson.

Potato 'The Major' (votes, unanimous), grown from tubers sent by Mr. E. R. Webber, St. Catherine's Hill, Worcester.

Potato 'Challenge' (votes, 5 for, 1 against), grown from tubers sent by Mr. R. Sydenham, Birmingham.

Potato 'Miss Ellen Terry' (votes unanimous), grown from tubers sent by Mr. C. F. Blinco, Haddon Villas, Hucknall Torkard.

Potato 'Fishtoft Seedling' (votes, unanimous), grown from tubers sent by Messrs. W. W. Johnson, Boston, Lincolnshire.

Potato 'Fidler's Queen' (votes, unanimous), grown from tubers sent by Messrs. Fidler, Reading.

Potato 'Ivo' (votes, unanimous), grown from tubers sent by Major Curtois.

Potato 'Devonian' (votes, unanimous), grown from tubers sent by Mr. O. Thomas, Royal Gardens, Windsor.

Tomato 'St. Simon' (votes, unanimous), grown from seeds sent by Mr. J. H. Wilson, Handsworth, Sheffield.

Tomato 'Stirling Castle' (votes, unanimous), grown from seeds sent by Messrs. Barr, Covent Garden, W.C.

Tomato 'The Peach Yellow' (votes, unanimous), from R.H.S.

FRUIT AND VEGETABLE COMMITTEE, SEPTEMBER 6, 1898.

PHILIP CROWLEY, Esq., in the Chair, and fourteen members present.

Awards Recommended:—

Silver Knightian Medal.

To Messrs. Rivers, of Sawbridgeworth, for Plum Trees in pots.

To Messrs. James Veitch, of Chelsea, for a collection of Apples, Plums, and Figs.

Bronze Banksian Medal.

To Messrs. Spooner, of Hounslow, for Apples.

First-class Certificate.

To Melon 'British Queen' (Hero of Lockinge \times Royal Ascot), (votes, 8 for, 6 against), from Her Majesty's Gardens, Windsor (gr. Mr. Owen Thomas, V.M.H.). Fruit almost round, skin pale yellow, densely netted; flesh white and very deep.

Award of Merit.

This award was unanimously recommended for all the Onions, Potatos, Tomatos, and Beet, which had been highly commended at Chiswick on August 30. (See pages 221, 228, 233, and 398.)

Cultural Commendation.

To Mr. Pocock (gr. to Lord Foley, Ruxley Lodge), for Peaches 'Princess of Wales.'

To Mr. J. Cole (gr. to H. Faure Walker, Esq., Balcombe), for Morello Cherries.

To Mr. J. Day (gr. to the Earl of Galloway, Garliestown), for Peaches 'Early Grosse Mignonne,' and Nectarines 'Rivers's Orange,' grown in the open air.

To Mr. Robinson, Elsfield, for Peaches 'Sea Eagle,' 'Princess of Wales,' and 'Lord Palmerston.'

To Mr. C. Last (gr. to H. O'Hagan, Esq., Hampton Court), for Peaches 'Exquisite,' and Nectarines 'Pine Apple' and 'Rivers's Orange.'

Other Exhibits.

Mr. J. Bailey, Farnham, sent a Seedling Apple, probably from 'Quarrenden.'

Messrs. R. Veitch, of Exeter, sent Melon 'Taunton Hero.'

Messrs. Laxton, Bedford, sent fruit of *Rubus palmatus*, and Strawberries 'Laxton's Perpetual' and 'St. Joseph.'

E. Sandys Lumsdaine, Esq., Edrom, N.B., sent Apple 'Strawberry Norman.'

Mr. E. Holden, Bath, sent a very fine Damson, said to be a new variety which originated at Bath.

Mr. W. Batchelor, Uxbridge, sent Alpine Strawberries from seed sown on April 11.

Sir J. Pease, Bart. (gr. Mr. McIndoe), sent fruits of the hybrid Japanese Plum 'Burbank.' It is a very prolific bearer, very early, and excellent in an orchard house, but is said to be too tender for out-of-doors in England, although a great favourite with fruit farmers in Nova Scotia.

Mr. Lindsay, Waltham St. Lawrence, sent an Apple very like the old 'Parsnip Apple.'

Messrs. Rivers, of Sawbridgeworth, sent a new Grape, derived from Australia, named 'Centennial.' It had enormous

oval berries of a greenish-white colour, juicy and refreshing, but curiously hollow in the centre, and of little flavour.

FRUIT AND VEGETABLE COMMITTEE, SEPTEMBER 20, 1898.

PHILIP CROWLEY, Esq., in the Chair, and twelve members present.

Awards Recommended:—

Silver Gilt Knightian Medal.

To Messrs. William Paul, Waltham Cross, for Fruit.

To Messrs. Laing, Forest Hill, for Apples and Pears.

Silver Knightian Medal.

To Messrs. J. Peed, West Norwood, for Fruit.

To Mrs. Wingfield (gr. Mr. Empson), Ampthill, for Onions.
(Fig. 79.)

To Mrs. Abbott (gr. Mr. Kelf), Regent's Park, for Fruit grown within two miles of Charing Cross.

To W. Roupell, Esq., Harvey Lodge, for Fruit.

Silver Banksian Medal.

To Leopold de Rothschild, Esq. (gr. Mr. Hudson), for Melons and 12 varieties of magnificent Plums.

To Lord Foley (gr. Mr. Miller) for Fruit.

To F. S. Roberts, Esq. (gr. Mr. Hamile), Jersey, for Fruit.

To Mrs. Gabriel (gr. Mr. Guyett), Streatham, for Fruit.

To W. Laurence, Esq. (gr. Mr. Robinson), Hollingbourne, for Fruit and Vegetables.

Award of Merit.

To Strawberry 'St. Joseph' (votes, 8 for, 2 against), from Leopold de Rothschild, Esq. (gr. Mr. Hudson), Gunnersbury. It was also shown by Messrs. Bunyard, of Maidstone; Messrs. Cannell, of Swanley; and Messrs. Laxton, of Bedford. This Strawberry, with 'Oregon,' 'Laxton's Perpetual,' and others, may be the forerunners of a race of really good autumn-fruiting Strawberries; but, as shown, the flavour left much to be desired, being distinctly inferior to 'Quatre Saisons amélioré.' (See page 322 *et seq.*)

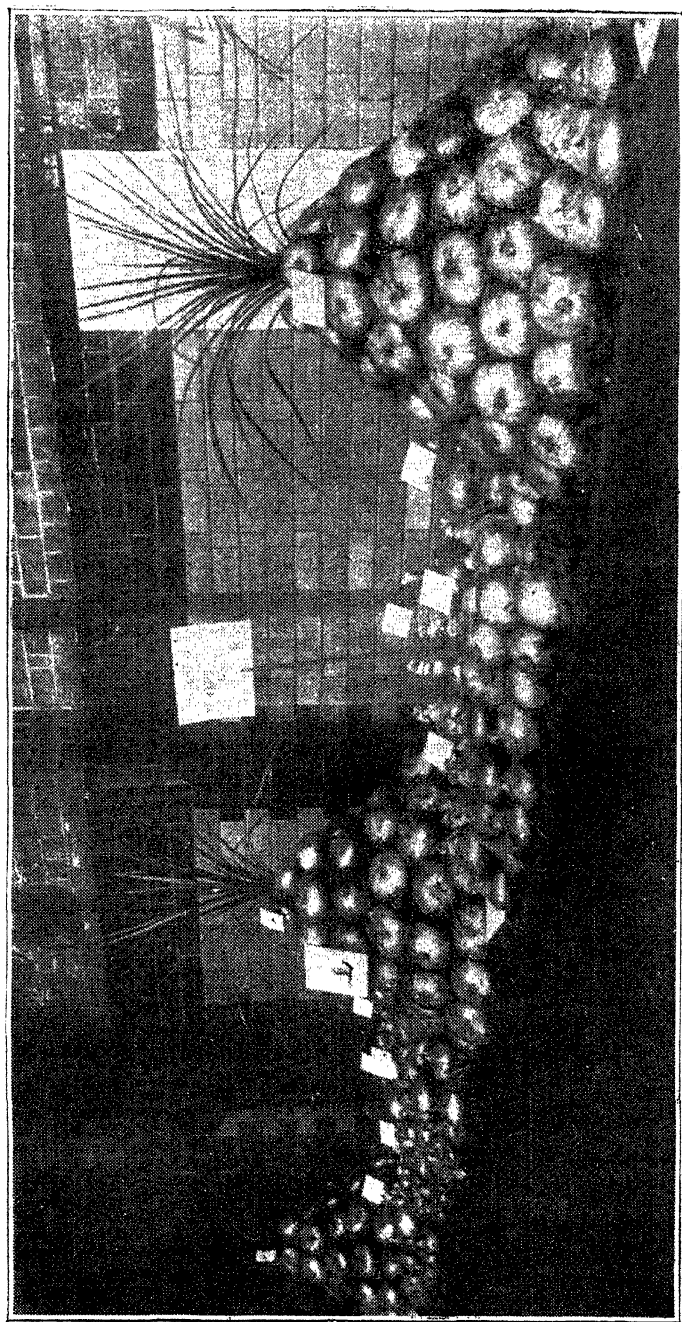


FIG. 79.—ONIONS FROM AMPHILL HOUSE. (*Journal of Horticulture.*)

Cultural Commendation.

To Mr. S. T. Wright, Superintendent of the Society's Gardens at Chiswick, for 100 dishes of Apples gathered from trees planted in 1896.

Other Exhibits.

Mr. Arthur Bull, of Cottenham, sent a dish of 'Pond's Seedling' Plums.

Messrs. Foot, of Sherborne, sent a Melon, 'Foot's Sherbonian.'

The Earl of Galloway (gr. Mr. Day), Garliestown, sent Apple 'Thorle Pippin,' syn. 'Summer Thorle.' A very handsome yellow fruit, with a crimson cheek, round, flat; eye open, and in a very slight depression; stalk very short in a wide depression; flavour excellent. An Apple specially recommended for Scotland.

F. S. Roberts, Esq., St. Saviour's, Jersey, sent a Tomato 'Beauvoir Hero' ('Perfection' × 'Challenger'). It was very like 'Perfection.' Seed was requested to be sent to Chiswick for trial.

Mr. Collins, Clapham Park, sent Fruit.

Mr. Green, of Dereham, sent Tomato 'Up to Date.' It was very like 'Conference' both in flavour and in appearance. Seed was requested to be sent to Chiswick for trial.

Mr. Holder, of Bath, again sent his new Damson, which was thought by some to be very similar to the 'Worcester Damson.'

Messrs. J. Veitch, of Chelsea, sent Peach 'Late Devonian.'

FLORAL COMMITTEE.

JULY 12, 1898.

W. MARSHALL, Esq., in the Chair, and twenty-one members present.

Awards Recommended:—

Silver Gilt Banksian Medal.

To Mr. H. B. May, Edmonton, for a large collection of Aspleniums.

To M. R. Smith, Esq., Beckenham (gr. Mr. C. Blick), for a group of Malmaison Carnations.

Silver Flora Medal.

To D. Cooper, Esq., Newmarket (gr. Mr. T. Young), for a group of Malmaison Carnations.

To Mr. F. G. Foster, Brockhampton, Havant, for a group of new and choice Sweet Peas.

To Mr. Chas. Turner, Slough, for a group of Garden Roses.

To Lord Penzance, Godalming (gr. Mr. G. Baskett), for a group of Hybrid Garden Roses.

Silver Banksian Medal.

To Messrs. J. Hill, Edmonton, for a group of Ferns.

To Messrs. W. Paul, Waltham Cross, for a group of Roses.

To Mr. Eckford, Wem, Salop, for a group of Sweet Peas.

To Messrs. Barr, Covent Garden, for a group of Iris.

To Messrs. Cannell, Swanley, for a group of Sweet Peas.

To Messrs. Paul & Son, Cheshunt, for a group of Roses.

To Messrs. Carter, High Holborn, for a group of Sweet Peas and Delphiniums.

To F. W. Campion, Esq., Reigate, for a group of Roses.

To Messrs. Frank Cant, Colchester, for a group of garden Roses.

Bronze Banksian Medal.

To Messrs. R. Wallace, Colchester, for a group of Lilies.

First-class Certificate.

To *Asplenium ornatum* (votes, 12 for), from Mr. H. B. May. The fronds are of medium size, much divided, and very graceful.

To *Abies Parryana glauca pendula* (votes, unanimous), from Messrs. Koster, Boskoop, Holland. A remarkably handsome Conifer. The plant exhibited was 8 feet high, with deep glaucous foliage and a pretty pendulous habit.

Award of Merit.

To Malmaison Carnation 'Nell Gwynne' (votes, 11 for), from Mr. J. Douglas, Great Bookham. Flowers of large size, pure white, but with no perfume.

To Malmaison Carnation 'Mrs. Martin Smith' (votes, unanimous), from M. R. Smith, Esq., Beckenham. Flowers large, of good form, and of a beautiful rich rosy-pink colour.

To Malmaison Carnation 'Calypso' (votes, 10 for, 7 against), from M. R. Smith, Esq. Flowers very pale blush, with a deeper shade at the centre.

To Carnation 'Sundridge' (votes, unanimous), from Mr. F. Tapper, Sundridge Park, Kent. A perpetual flowering variety of splendid form and substance, of a deep fiery scarlet colour.



FIG. 80.—ROSE 'PERLE DES ROUGES.' (*Journal of Horticulture*.)

To Rose 'Perle des Rouges' (votes, 9 for, 8 against), from Messrs. W. Paul, Waltham Cross. One of the Polyantha varieties, producing purplish-crimson flowers in large trusses. (Fig. 80.)

To Rose 'Edith Turner,' h.p. (votes, unanimous), from Mr. Chas. Turner, Slough. Flowers large, of fine form, and the petals a soft flesh colour changing to nearly white.

To Sweet Pea 'Aurora' (votes, 13 for), from Mr. F. G. Foster, Brockhampton. Flowers white, heavily striped with pinkish-rose.

To Sweet Pea 'Golden Gate' (votes, 12 for, 8 against), from Mr. F. G. Foster. Flowers pale blue, slightly shaded with mauve.

To *Polystichum* × *Marshalli* (*angulare* × *aculeatum*) (votes, unanimous), from W. Marshall, Esq., Bexley. A tall growing variety, with fronds intermediate in character, basal pinnæ showing cruciation.

Other Exhibits.

Mr. J. Douglas, Great Bookham, sent flowers of Border and Malmaison Carnations, also several varieties of Pinks.

From Messrs. Atlee Burpee, Philadelphia, U.S.A., came two new dwarf Sweet Peas.

Mr. Ford, Brixton, sent Zonal Pelargonium 'Queen Victoria,' a variety with large pink flowers.

Messrs. J. Veitch, Chelsea, sent plants of *Richardia Rehmanni*.

From Mr. H. B. May came plants of *Abutilon* 'Golden Fleece.' A variety with rich golden flowers.

Mr. J. Bryson, Helensburgh, sent Rose 'Daydream.'

From Leopold de Rothschild, Esq. (gr. Mr. Reynolds), Gunnersbury Park, Acton, came Tree Carnation 'Mr. Leopold de Rothschild.'

The Duke of Marlborough, Blenheim, Woodstock (gr. Mr. Whillans), sent Carnations.

Sir Trevor Lawrence, Bart., Burford, Dorking (gr. Mr. Bain), sent *Philadelphus Lemoinei* 'Candelabra' and *Phlox* 'Lumineux.'

From Mr. Batho, Jersey, came Pink 'John Batho.'

ROSE SHOW, JULY 12, 1898.

MIXED VARIETIES.

Class 1.—Eighteen single trusses, distinct. Amateurs.

First Prize, Silver Cup or £4.; Second, £2.; Third, £1.

1. O. G. Orpen, Esq., West Bergholt, Colchester.
2. T. B. Haywood, Esq., Woodhatch, Reigate.
3. C. J. Grahame, Esq., Wrydelands, Leatherhead.

Class 2.—Eighteen single trusses, distinct. Open.

First Prize, £3. ; Second, £2. ; Third, £1.

1. Messrs. Prior & Son, Colchester.
2. Messrs. Frank Cant, Colchester.
3. Messrs. Paul & Son, The Old Nurseries, Cheshunt.

Class 3.—Twelve single trusses, distinct. Amateurs.

First Prize, £2. ; Second, £1. 10s. ; Third, £1.

1. E. Mawley, Esq., Rosebank, Berkhamsted.
2. A. Tate, Esq., Downside, Leatherhead.
3. Rev. A. Foster-Melliar, Sproughton Rectory, Ipswich.

Class 4.—Six single trusses, distinct. Amateurs.

First Prize, £1. ; Second, 15s. ; Third, 10s.

1. G. W. Cook, Esq., The Briers, North Finchley.
2. J. T. Thompson, Esq., The Laurels, Pounds Green.
3. P. G. C. Burnand, Esq., Hill Grange, Reigate.

Class 5.—Nine single trusses of any one variety of H. P. or H. T.

First Prize, £1. 10s. ; Second, £1. ; Third, 15s.

1. T. B. Haywood, Esq.
2. C. J. Grahame, Esq.
3. O. G. Orpen, Esq.

Class 6.—Six single trusses of any one variety of H. P. or H. T.

First Prize, £1. ; Second, 15s. ; Third, 10s.

1. G. W. Cook, Esq.
2. A. Tate, Esq.
3. E. M. Bethune, Esq., Denne Park, Horsham.

TEAS AND NOISETTES.

Class 7.—Eighteen trusses, not less than twelve varieties, or more than two trusses of any one variety. Amateurs.

First Prize, Silver Cup or £4. ; Second, £2. ; Third, £1.

1. O. G. Orpen, Esq.
2. E. M. Bethune, Esq.
3. Rev. A. Foster-Melliar.

Class 8.—Eighteen single trusses, distinct. Open.

First Prize, £3. ; Second, £2. ; Third, £1.

1. Messrs. Prior & Son.
2. Mr. George Prince, Oxford.
3. Messrs. Frank Cant & Co.

Class 9.—Twelve single trusses, not less than nine or more than two trusses of any one variety. Amateurs.

First Prize, £2.; Second, £1. 10s.; Third, £1.

1. Rev. W. H. Jackson, Stagsden Vicarage, Bedford.
2. J. T. Strange, Esq., Aldermaston, Reading.
3. E. Mawley, Esq.

Class 10.—Six single trusses, not less than four varieties. Amateurs.

First Prize, £1.; Second, 15s.; Third, 10s.

1. Miss B. H. Langton, Raymead, Hendon.
2. R. W. Bowyer, Esq., Haileybury College, Hertford.
3. J. T. Thompson, Esq.

Class 11.—Nine single trusses of any one variety. Amateurs.

First Prize, £1. 10s.; Second, £1.; Third, 15s.

1. O. G. Orpen, Esq.
2. C. J. Grahame, Esq.
3. Rev. W. H. Jackson.

Class 12.—Six single trusses of any one variety. Amateurs.

First Prize, £1.; Second, 15s.; Third, 10s.

1. E. M. Bethune, Esq.
2. Rev. A. Foster-Melliar.
3. F. W. Flight, Esq., Twyford, Winchester.

FLORAL COMMITTEE, JULY 26, 1898.

W. MARSHALL, Esq., in the Chair, and eighteen members present.

Awards Recommended :—

Gold Medal.

To A. B. Freeman-Mitford, Esq., C.B., Batsford Park, Moreton-in-Marsh (gr. Mr. J. Garrett), for a large and magnificent collection of Bamboos. (See page 288.)

Silver Gilt Flora Medal.

To Messrs. Jas. Veitch, Chelsea, for a group of Bamboos.]

Silver Gilt Banksian Medal.

To Mr. H. B. May, Edmonton, for a large group of Pteris.

To Messrs. Wallace, Colchester, for a group of Lilies.

Silver Flora Medal.

To Messrs. Dobbie, Rothesay, for Sweet Peas and Violas.

To R. Hoffman, Esq., Thurlow Lodge, West Dulwich (gr. Mr. T. Tomlinson), for a group of finely coloured Caladiums.

To Messrs. W. Paul, Waltham Cross, for a group of Roses.

To Messrs. Cannell, Swanley, for a group of Cacti.

Silver Banksian Medal.

To Mr. V. N. Gauntlett, Redruth, Cornwall, for Bamboos.

To Messrs. Jas. Veitch for Carnations.

To Messrs. Barr, Covent Garden, for herbaceous flowers.

To Messrs. W. Cutbush for a group of Carnations.

To Mr. T. S. Ware for Bamboos and herbaceous plants.

To C. J. Grahame, Esq., Wrydelands, Leatherhead, for Roses.

To Mr. M. Prichard, Christchurch, for herbaceous flowers.

First-class Certificate.

To *Nymphæa odorata rosacea* (votes unanimous), from Leopold de Rothschild, Esq., Gunnersbury House, Acton (gr. Mr. J. Hudson), a very pretty pink flower, with a pleasing fragrance.

To *Nymphæa gloriosa* (votes unanimous), from Leopold de Rothschild, Esq. Flowers a deep reddish crimson, large and vigorous.

To *Arundinaria nitida* (votes unanimous), from Messrs. Jas. Veitch. A very graceful plant with long slender growths, with dark stems and narrow foliage of a bright green hue. (Fig. 67.)

Award of Merit.

To Rose 'Souvenir de Madame Levett' (Tea) (votes, 9 for), from Messrs. W. Paul. Beautiful semi-double flowers, of a rich apricot-yellow colour, produced in large clusters.

To Rose 'Charlotte Gillemot' (H.T.) (votes, 7 for, 5 against), from Messrs. W. Paul. A large pure white flower with large petals inclined to reflex at the apex.

To *Buddlea variabilis* (votes, 11 for, 3 against), from Messrs. W. Paul. Flowers borne in long spikes of a pretty lilac shade, with a small yellow eye; a distinct variety, and said to be quite hardy. (Fig. 81.)

To Carnation 'Lady Sophie' (votes, unanimous), from Mr. F. Tapper, Sundridge Park, Kent. A perpetual flowering

variety of good habit and flowers of much substance, of a rosy salmon colour.

To Carnation 'Isinglass' (votes, unanimous), from T. B. Haywood, Esq., Woodhatch, Reigate (gr. Mr. C. J. Salter). A remarkably fine border variety with large flowers of good form, with great petals of a brilliant crimson hue and very fragrant.

To *Arundinaria Veitchii* (votes, 8 for, 1 against), from Messrs. J. Veitch. A handsome dwarf growing variety with broad foliage.

To *Phyllostachys Castillonis* (votes, 4 for, 3 against), from Messrs. J. Veitch. An exceedingly graceful Bamboo with narrow, deep glossy-green leaves beautifully variegated with white.

To *Pelargonium 'Achievement'* (votes, unanimous), from Mr. H. J. Jones, Lewisham. This is the result of crossing a single white zonal *Pelargonium* with the ivy-leaved variety 'Souvenir de Charles Turner.' The plant exhibits its parentage in its foliage and sturdy habit. The flowers are a reddish salmon produced in large bold trusses.

To *Phyllostachys fulva* (votes, unanimous), from A. B. Freeman Mitford, Esq., C.B. A beautiful Bamboo of slender growth which branches freely and is covered with narrow leaves of a bright green. (Fig. 64, page 276.)

To *Arundinaria aristata* (votes, unanimous), from A. B. Freeman Mitford, Esq., C.B. A tall growing handsome variety of graceful habit, covered with bright green foliage. (Fig. 63, page 274.)

Other Exhibits.

Mr. Henry Eckford, Wem, Salop, sent twelve varieties of Sweet Peas, which were sent to Chiswick for comparison with the varieties growing there.

From Messrs. Sander & Co., St. Albans, came a small group of stove plants.

Messrs. Jas. Veitch sent *Althæa 'Primrose Queen,'* the result of crossing *Althæa rosea* ♂ with *A. ficifolia* ♀. (Fig. 82.)

From Messrs. Hurst, Houndsditch, came *Tropæolum Lobbianum*, with ivy-leaved foliage.

Mr. Winwood, Ashton-on-Ribble, sent *Adiantum Ashtoni*.

Mrs. Sidney Williams, Hindhead, sent *Pelargoniums*.

From Messrs. Perry, Duke Street, W., came some patent paper labels.

The Countess of Lonsdale, Barley Thorpe, Oakham (gr. Mr. W. Doidge), sent an unnamed seedling Pink.

From Walter Cobb, Esq., Dulcote, Tunbridge Wells, came leaves of *Streptocarpus* grown in a cool house.

Mr. A. Perry, Winchmore Hill, sent herbaceous flowers.

Dr. R. Sisley, The Saville Club, sent seedling Carnations.

FLORAL COMMITTEE, AT CHISWICK, JULY 27, 1898.

W. MARSHALL, Esq., in the Chair, and seven members present.

Awards Recommended:—

Award of Merit.

To *Viola* 'The Marchioness,' from Mr. J. Forbes and Messrs. Dobbie.

To *Leptosiphon roseus*, from Messrs. Jas. Veitch.

Highly Commended. (See page 374 *et seq.*)

To *Viola* 'The Mearns,' from Mr. J. Forbes.

To *Viola* 'Bridegroom,' from Mr. J. Forbes.

To *Viola* 'Gipsy Queen,' from Messrs. Dobbie.

To *Canna* 'La France,' from Messrs. Jas. Veitch & Sons. A splendid variety with dark Maranta-like foliage and flowers of great size, orange scarlet mottled with a paler shade of the same colour.

To *Canna* 'Chiswick King,' from R.H.S. A seedling variety of very dwarf habit, with bright green foliage and flowers of large size, good form, very deep crimson colour, and good spikes.

To *Canna* 'Reichskanzler Fürst Hohenlohe,' from Messrs. Jas. Veitch & Sons. Plant dwarf, with deep green foliage, producing large spikes of medium-sized flowers. Colour lemon yellow, lined and shaded with a lovely buttercup yellow, the lower petal mottled with red.

To *Canna* 'Hofgartendirector Wendland,' from Mr. W. Pfitzer. Plant moderately dwarf, with green foliage. Flowers

intense crimson, margined with pale yellow, of good form, and borne on large spikes. A beautiful variety.

To Carnation 'Firefly,' fine scarlet, with a perfect calyx and free flowering habit.

To Carnation 'Rosy Morn,' beautiful deep rose, with a good calyx; very free bloomer.

To Carnation 'Black Douglas,' deep purple, with perfect calyx.

To Carnation 'Cygnets,' pure white, wonderfully dwarf, and a profuse bloomer.

To Carnation 'Goletta,' white, striped with deep rose. An excellent flower.

To Carnation 'Lady Primrose,' a pretty primrose colour.

The above Carnations were all raised in the Society's Gardens from seed sent by Mr. J. Douglas, Great Bookham, and were named by the Committee.

To *Clarkia elegans rosea*, from Messrs. Jas. Veitch.

To *Godetia rosea alba*, from Messrs. Jas. Veitch.

To *Godetia gloriosa*, from Messrs. Jas. Veitch.

To *Godetia* 'La Belle,' from Messrs. Jas. Veitch.

To *Godetia* 'Butterfly,' from Messrs. Jas. Veitch.

To *Godetia Whitneyi*, from Messrs. Jas. Veitch.

To *Alyssum maritimum minimum*, from Messrs. Jas. Veitch.

To Candytuft, 'Rose Cardinal,' from Messrs. Jas. Veitch.

To *Eschscholtzia* 'Mandarin,' from Messrs. Jas. Veitch.

To *Gypsophila elegans*, pure white, from Messrs. Jas. Veitch.

To *Papaver* 'Danebrog,' from Messrs. Jas. Veitch.

To Poppy 'White Swan,' from Messrs. Jas. Veitch.

To Poppy 'Cardinal,' from Messrs. Watkins & Simpson.

To *Viscaria cardinalis*, from Messrs. Watkins & Simpson.

To *Godetia compacta* 'Duchess of Albany,' from Messrs. Watkins & Simpson.

To *Godetia* 'Fairy Queen,' from Messrs. Watkins & Simpson.

To *Godetia Whitneyi compacta* 'Brilliant,' from Messrs. Watkins & Simpson.

To Sweet Pea 'Oriental,' from Messrs. Atlee Burpee.

To Sweet Pea 'Fascination,' from Mr. H. Eckford.

To Sweet Pea 'Coccinea,' from Mr. H. Eckford.

To Sweet Pea 'Duke of Westminster,' from Mr. H. Eckford.

To Sweet Pea 'Duchess of Westminster,' from Mr. Eckford.

To Sweet Pea 'Sadie Burpee,' from Mr. H. Eckford.

To Sweet Pea 'Mrs. Fitzgerald,' from Mr. H. Eckford.
To Antirrhinum 'Dwarf Yellow,' from Messrs. Jas. Veitch.
To Antirrhinum 'The Moor,' from Mr. W. Marshall.

FLORAL COMMITTEE, AUGUST 9, 1898.

W. MARSHALL, Esq., in the Chair, and fifteen members present.

Awards Recommended:—

Silver Gilt Flora Medal.

To Her Majesty the Queen (gr. Mr. O. Thomas) for *Nepenthes*.

Silver Gilt Banksian Medal.

To Mrs. Abbott, South Villa, Regent's Park (gr. Mr. G. Kelf), for flowering and foliage plants.

To Mr. H. B. May, Edmonton, for a collection of *Nephrolepis*.

Silver Flora Medal.

To A. B. Freeman-Mitford, Esq., C.B., Batsford Park, Moreton-in-the Marsh (gr. Mr. J. Garrett), for twelve varieties of hardy Water Lilies.

To Messrs. W. Paul, Waltham Cross, for Hollyhocks, Phloxes, and Yuccas.

To Messrs. Kelway, Langport, for *Gladiolus* and hardy perennials.

Silver Banksian Medal.

To Leopold de Rothschild, Esq., Gunnersbury House, Acton (gr. Mr. J. Hudson), for hardy Water Lilies.

To Earl Percy, Syon House, Brentford (gr. Mr. G. Wythes), for *Campanulas*.

To Mr. S. Mortimer, Farnham, Surrey, for a collection of Dahlias.

To Mr. M. Prichard, Christchurch, Hants, for hardy flowers.

To Messrs. R. Wallace, Colchester, for Lilies, *Montbretias* and *Calochorti*.

To Mr. J. Walker, Thame, for a collection of Dahlias.

Bronze Flora Medal.

To W. Robinson, Esq., Gravetye, for hardy Water Lilies.

To Messrs. Webb & Brand, Saffron Walden, for Hollyhocks.

Bronze Banksian Medal.

To Lord Hillingdon, Hillingdon Court, Uxbridge (gr. Mr. Allan), for Border Carnations.

To Messrs. W. Cutbush, Highgate, for cut flowers.

First-class Certificate.

To *Nelumbium speciosum nuciferum* (votes, unanimous), from Her Majesty the Queen (gr. Mr. O. Thomas). A very rarely seen but most beautiful greenhouse aquatic with large cream-white deliciously scented flowers. The Lotus of Egypt and Japan.

To *Furcraea* (*Fourcroya*) *Watsoniana* (votes, 9 for), from Messrs. Sander, St. Albans. A handsome foliage plant with leathery lanceolate leaves, two feet long and three inches broad. The colour of the central portion is bluish green, with a cream-white band on either side, and irregularly bordered with deep green striped with cream white.

Award of Merit.

To *Nymphæa Marliacea ignea* (votes, unanimous), from A. B. Freeman Mitford, Esq., C.B., Batsford Park, Moreton-in-the-Marsh (gr. Mr. J. Garrett). The large beautifully formed flowers are of a rosy-crimson hue.

To *Chrysanthemum* 'Madame Marie Masse' (Jap.) (votes, unanimous), from T. B. Haywood, Esq., Woodhatch, Reigate (gr. Mr. C. J. Salter). A free flowering bedding variety of bushy habit, with flowers of a lovely shade of rosy lilac shaded with bronze yellow in the centre. Height 2 feet.

To *Gladiolus Lemoinei* 'Baron J. Hulot' (votes, unanimous), from Mr. M. Prichard, Christchurch, Hants. A very distinct variety, with medium-sized flowers; colour violet purple shaded with blue.

To *Gladiolus Lemoinei* 'Vésuve' (votes, 13 for), from Mr. M. Prichard. A beautiful variety, with long spikes of crimson-scarlet flowers striped with white down the centre of each segment.

To *Gladiolus* 'W. B. Child' (votes, unanimous), from Messrs. Kelway, Langport. The rosy-scarlet flowers are shaded with purple and dotted with creamy white on the lower segment.

To *Carnation* 'Nox' (votes, 9 for, 6 against), from Mr. J. Douglas, Edenside, Great Bookham, Surrey. The crimson-maroon flowers are small, well formed, and very fragrant.

Other Exhibits.

R. Sisley, Esq., Ockford, Godalming, sent a collection of seedling Carnations.

W. H. Evans, Esq., Forde Abbey, Chard (gr. Mr. J. Crook), sent flowers of *Gloriosa grandiflora*.

From the Director, Botanic Gardens, Utrecht, came a bunch of *Viola tricolor* 'Thomas Glenn.'

Mrs. Wakefield, Uxbridge, sent flowers of *Chrysanthemum maximum*, 'Wakefield var.'

A. Spurling, Esq., Blackheath Park, brought three varieties of border Carnations.

Earl Fitzwilliam, Wentworth Woodhouse, Rotherham (gr. Mr. J. Hughes), sent a seedling *Croton* named *Wentworthiana*.

From R. Morris, Esq., J.P., Beechfield, Doncaster (gr. Mr. E. Hill), came a handsome spathe of *Anthurium Andreanum* Morrissi.

From Mr. J. Douglas, Great Bookham, came a group of bedding Carnations.

Mr. S. Treseder, Pwll Coch, Cardiff, sent Roses.

Messrs. J. Veitch & Sons, Chelsea, sent a plant in flower of *Kalo-Rochea Langleyensis*, a cross between *Kalosanthus coccinea* ♀ and *Rochea falcata* ♂, which was referred to the Scientific Committee.

Mr. M. Outhbertson, Rothesay, sent flowers of *Astilbe* 'Gerbe d'Argent' and *Spiræa gigantea*. The Committee asked to see a plant of the first named.

Mr. D. Bigg, St. Margaret's, Twickenham, sent specimens of a huge Sunflower.

FLORAL COMMITTEE, AT CHISWICK, AUGUST 16, 1898.

W. MARSHALL, Esq., in the Chair, and eight members
present.

Awards Recommended :—

Award of Merit.

To Canna 'Parthenope' (votes, unanimous), from Messrs. Dammann, Naples.

To Canna 'W. Marshall' (votes, unanimous), from R.H.S., Chiswick.

Highly Commended.

To Viola 'Bronze Queen' (votes, unanimous), from Mr. J. Forbes, Hawick.

To Dianthus chinensis Heddewegii, fl. pl. (votes, unanimous), from Messrs. J. Veitch, Chelsea.

To Dianthus chinensis laciniatus (votes, unanimous), from Messrs. J. Veitch.

To Canna 'Comtesse Florence de Vortaux' (votes, unanimous), from Messrs. Vilmorin, Paris.

FLORAL COMMITTEE, AUGUST 23, 1898.

W. MARSHALL, Esq., in the Chair, and eighteen members
present.

Awards Recommended :—

Silver Gilt Banksian Medal.

To Messrs. Kelway, Langport, for Gladioli.

To Messrs. Wallace, Colchester, for Lilies, Montbretias, and Gladiolus.

Silver Flora Medal.

To Sir Trevor Lawrence, Bart., Burford, Dorking (gr. Mr. Bain), for Gladioli.

To Messrs. Barr, Covent Garden, for hardy flowers.

To Mr. H. B. May, Edmonton, for Bouvardias.

Silver Banksian Medal.

To P. Purnell, Esq., Woodlands, Streatham Hill, for foliage and flowering plants.

To Mr. Ware, Tottenham, for Dahlias, &c.

To Messrs. Cannell, Swanley, for hardy flowers.

Award of Merit.

To *Nymphæa odorata sulphurea grandiflora* (votes, unani-



FIG. 83.—*HUNNEMANNIA FUMARIEFOLIA*. (*Journal of Horticulture*.)

mous), from Leopold de Rothschild, Esq., Gunnersbury House, Acton (gr. Mr. J. Hudson) A very fine yellow variety, free

flowering; blooms large and borne on stiff stems eight inches above the surface of the water.

To *Gladiolus Lemoinei* 'Madame Desbordes Valmore' (votes, unanimous), from Messrs. Wallace and Messrs. Barr. The large salmon-pink flowers are blotched and striped with crimson scarlet on the lower segments.

To *Lathyrus grandiflora alba* (votes, unanimous), from Mr. Green, Dereham. A vigorous growing seedling everlasting Pea, with stout spikes of unusually large pure white flowers. An exceptionally free flowering variety.

To *Hunnemannia fumariæfolia* (votes, unanimous), from Messrs. Veitch, Chelsea. The deep golden yellow poppy-like flowers, with conspicuous yellow anthers in the centre, are very handsome. The foliage is elegantly cut and of a glaucous green hue. This charming Mexican annual delights in a warm soil and sunny position. (Fig. 83.)

Other Exhibits.

Miss Aldersey, Aldersey Hall, Chester, sent a Cactus Dahlia. From Lord Wantage, Lockinge Park, Wantage (gr. Mr. W. Fyfe), came two varieties of Hollyhocks.

G. Gosmev, Esq., Elmfield Lodge, Southall, sent Cactus Dahlia 'Elmfield Beauty.'

H. Morgan, Esq., Fiskerton, Newark, sent Carnations.

Mr. Boyes, Whitegate Lane, Blackpool, sent small plants of a new *Coleus* named 'Admiral Dewey.'

Mr. J. Evans, Darley Dale, Matlock Bath, brought two exceptionally well-flowered plants of Carnation 'Winnie Webb.'

Messrs. Sander, St. Albans, sent a group of flowering and foliage plants.

FLORAL COMMITTEE, AT CHISWICK, AUGUST 30, 1898.

W. MARSHALL, Esq., in the Chair, and four members present.

Awards Recommended:—

Highly Commended.

To *Pelargonium* 'La Favourite' (votes, unanimous), from W. Marshall, Esq., Auchinraith, Bexley. The Committee were

of opinion that the variety 'White Abbey,' sent by Messrs. Cannell, Swanley, was synonymous with 'La Favourite.'

FLORAL COMMITTEE, SEPTEMBER 6, 1898.

W. MARSHALL, Esq., in the Chair, and sixteen members
present.

Awards Recommended :—

Silver Gilt Banksian Medal.

To Messrs. J. Cheal, Crawley, for Dahlias, amongst which was the very curious 'Fantasy' (Fig. 84), and sprays of flowering and ornamental trees and shrubs.

Silver Flora Medal.

To Messrs. J. Hill, Edmonton, for Ferns.

Silver Banksian Medal.

To A. J. Howard, Esq., Worton Hall, Isleworth (gr. Mr. A. Pentney), for Cannas.

To Messrs. J. Veitch, Chelsea, for hardy Water-lilies and Hibiscuses.

To Mr. H. B. May, Edmonton, for flowering plants.

Bronze Banksian Medal.

To Mr. W. Rumsey, Waltham Cross, for Roses.

First-class Certificate.

To *Acer Negundo elegans* (votes, unanimous), from Messrs. Paul, Cheshunt. This is much freer in growth than *A. N. variegata*. The long stout stems are covered with a lovely glaucous bloom, while the rich green leaves are splashed and irregularly margined with yellow, fading with age to cream white.

Award of Merit.

To *Lobelia Rivoirei* (votes, 8 for, 5 against), from Sir Trevor Lawrence, Bart., Dorking (gr. Mr. W. Bain). An erect free growing plant, similar in habit to *L. 'Carmine Gem.'* The deep-green leaves are lanceolate, and the racemes of pale pink flowers are borne with moderate freedom. (Figs. 85, 86.)

To *Helenium autumnale superbum* (votes, 8 for, 1 against), from Sir Trevor Lawrence (gr. Mr. W. Bain). A particularly fine hardy border plant, bearing an abundance of single yellow flowers on erect freely branched spikes 5 ft. high.

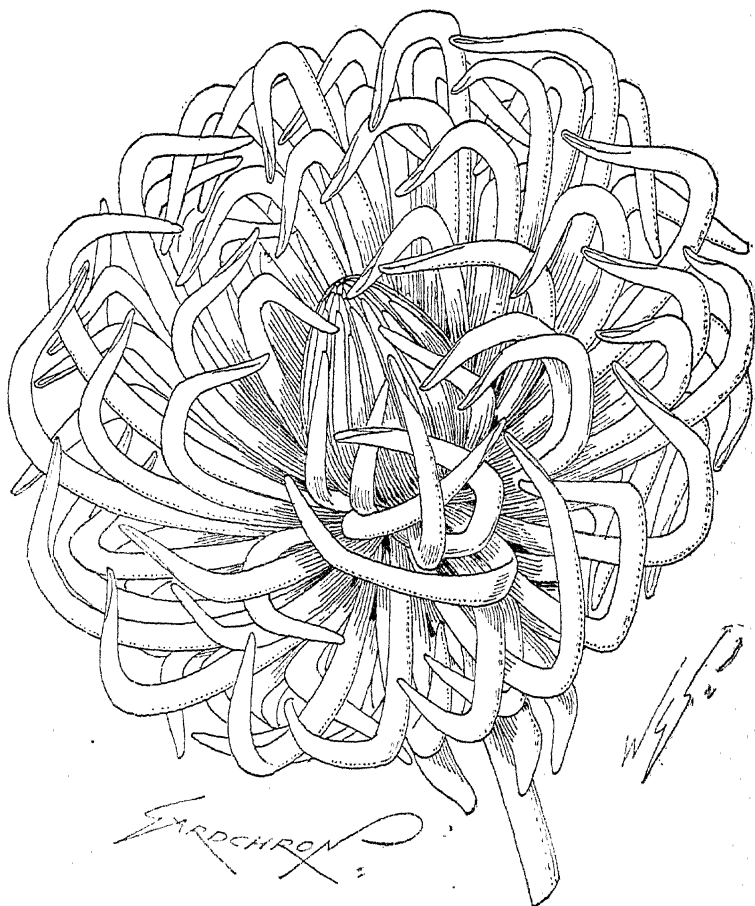


FIG. 84.—*DAHLIA 'FANTASY.'* (*Gardeners' Chronicle.*)

To single Dahlia 'Columbine' (votes, 8 for), from T. W. Girdlestone, Esq., Sunningdale, Berks. A distinct variety, with medium-sized good-shaped flowers; colour rosy purple, running to pale orange towards the base of the petals.

To single Dahlia 'Puck' (votes, unanimous), from T. W.

Girdlestone, Esq. Small flowers, bronze yellow, with a distinct crimson circle round the disc.

To Pompon Dahlia 'Lady Rogers' (votes, unanimous), from



FIG. 86.—LOBELIA RIVOIREI. (*Journal of Horticulture*.)

Sir Robert Hargreaves Rogers, Marle House, Bexley (gr. Mr. Leggatt). This is a sport from the well-known variety 'White Aster.' The white flowers, tinged with green in the centre, are of good form, borne very freely, and thrown well above the foliage.

To *Dracæna* 'Duchess of York' (votes, 10 for), from Messrs. Veitch. The long, narrow, gracefully arching bronze-green leaves are distinctly margined with bright rose-pink. The young leaves are pale green, suffused with soft rose. A fine decorative variety.

To *Cactus Dahlia* 'Magnificent' (votes, unanimous), from Mr. J. Stredwick, Silver Hall Park, St. Leonards. The large flowers with long sharply pointed petals are of a pretty shade of orange buff touched with rose.

To *Cactus Dahlia* 'Mrs. Finlay Campbell' (votes, 11 for), from Messrs. J. Cheal. Large orange-scarlet flowers of excellent shape.

To *Cactus Dahlia* 'Lorelei' (votes, 7 for, 3 against), from Messrs. J. Cheal. A beautiful variety, with long incurved petals, bright pink, shading to delicate pink in the centre.

Other Exhibits.

Sir Trevor Lawrence, Bart. (gr. Mr. Bain), sent a collection of seedlings of *Pentstemon hybridus grandiflorus* and a vase of *Rudbeckia bicolor superba*.

Miss Aldersey, Aldersey Hall, Chester, sent seedling *Cactus Dahlias*.

R. Brocklebank, Esq., Haughton Hall, Tarporley (gr. Mr. T. Winkworth), sent *Dahlia* 'Helen Winkworth.'

C. F. Thompson, Esq., Penhill Close, Cardiff (gr. Mr. T. Mann), sent specimens of *Gladiolus* 'The Dean,' a cross between *G. Brenchleyensis* and *G. Gandavensis*.

Mrs. Ravenhill, Woodside, Windsor Forest (gr. Mr. J. Wells), brought a prettily marked *Acalypha* named 'Novelty,' which the Committee asked to see again.

W. F. Walker, Esq., Highly Manor, Balcombe (gr. Mr. J. Cole), sent single *Dahlia* 'Mrs. F. Walker.'

Mr. W. Parrott, Montreal, Sevenoaks, brought three varieties of single *Dahlias*.

Mr. W. Talley, Elder Road, West Norwood, sent examples of the new 'conservation' flower pot, in which the holes are bored an inch above the base instead of in the centre, as in the ordinary flower pot, with the double object of preserving moisture and excluding worms.

Messrs. F. Sander, St. Albans, sent a small group of foliage and flowering plants.

Messrs. James Veitch, Chelsea, sent a group of *Gladiolus Childsi* hybrids.

O. Owen, Esq., Grove End Road, N.W. (gr. Mr. H. Gutt), sent a *Chrysanthemum* 'Bud and plant protector.'

FLORAL COMMITTEE, SEPTEMBER 20, 1898.

W. MARSHALL, Esq., in the Chair, and thirteen members present.

Awards Recommended:—

Silver Gilt Flora Medal.

To Messrs. J. Burrell, Cambridge, for *Gladioli* and *Dahlias*.

To Messrs. Paul & Son, Cheshunt, for autumn flowers and foliage.

Silver Gilt Banksian Medal.

To Mr. H. B. May, Upper Edmonton, for fifty species and varieties of *Davallias*.

To Messrs. W. Paul, Waltham Cross, for *Roses*.

Silver Flora Medal.

To Leopold de Rothschild, Esq., Gunnersbury House, Acton (gr. Mr. J. Hudson), for *Acalypha Sanderi* and *Salvia splendens grandiflora*.

To Mr. S. Mortimer, Farnham, for *Show* and *Cactus Dahlias*.

To Messrs. J. Cheal, Crawley, for a collection of *Dahlias*.

Silver Banksian Medal.

To Mr. J. H. Witty, Nunhead Cemetery, S.E., for early flowering *Chrysanthemums*.

To Mr. T. S. Ware, Tottenham, for *Dahlias* and *Cannas*.

To Mr. C. Turner, Slough, for 36 varieties of *Cactus Dahlias*.

To Mr. W. Wells, Redhill, Surrey, for early flowering *Chrysanthemums*.

To Mr. F. G. Foster, Havant, Hants, for *Sweet Peas*.

Bronze Banksian Medal.

To Lady Freake, Fulwell Park, Twickenham (gr. Mr. Rickwood), for Cannas.

First-class Certificate.

To *Pandanus Sanderi* (votes, unanimous), from Messrs. Sander, St. Albans. A very ornamental plant, with arching leaves 4 feet long, rich green striped with yellow. The spines on the under surface of the midrib are short and stout.

To *Ligustrum Walkeri* (votes, 6 for, 3 against), from Messrs. Paul & Son, Cheshunt. An Indian Privet having small twisted or undulated leaves arranged in pairs on wiry stems. It is said to be not hardy, and would be of doubtful utility in a greenhouse. (Fig. 87.)

Award of Merit.

To *Acer Juhlkei variegata* (votes, 9 for, 2 against), from Messrs. Paul, Cheshunt. The deeply divided leaves of this variety are very distinct, striped with creamy white and rose on a green ground. The under surface is a lovely glaucous hue, and the bright red petioles are very showy.

To *Hibiscus totus albus* (votes, unanimous), from Messrs. Paul. The single flowers are pure white and somewhat larger than those of the well-known *H. syriacus*.

To *Gynerium argenteum aureum lineatum* (votes, unanimous), from Messrs. J. Veitch, Chelsea. This is a dwarf growing variety of the Pampas Grass, with long narrow leaves bordered with yellow.

To Japanese *Chrysanthemum* 'May Manser' (votes, unanimous), from Mr. H. J. Jones, Lewisham. Plant of dwarf, sturdy habit, with large well-formed pure white flowers.

To Japanese *Chrysanthemum* 'Louis Lemaire' (votes, 7 for), from Mr. Wells, Redhill. A sport from 'Gustave Grunnerwald,' with orange yellow flowers flushed with bronze. The plant is dwarf, compact, and very free flowering.

To *Populus ontariensis variegata* (votes, 7 for, 3 against), from Mr. J. Carter, Willow Bank, Keighley. A vigorous growing Poplar, with large heart-shaped leaves mottled and blotched with yellow on a green ground.

To *Adiantum Faulkneri* (votes, unanimous), from T. Rochford, Esq., Turnford. A compact, bushy variety, bearing some

resemblance to *A. gracillimum*. The pinnae are small, crimped, and of a pleasing shade of soft green.



FIG. 87.—*LIGUSTRUM WALKERI*. (*Journal of Horticulture*.)

To Cactus Dahlia 'Countess of Lonsdale' (votes, unanimous), from Messrs. Keynes Williams, Salisbury. Flowers purplish rose shaded with orange.

To Cactus Dahlia 'Progenitor' (votes, unanimous), from Messrs. Keynes Williams. The exceptionally large and handsome flowers are bright scarlet tinged with purple. The petals are broad and forked at the tips.

To Cactus Dahlia 'Viscountess Sherbrooke' (votes, unanimous), from Messrs. Keynes Williams. Flowers rich orange suffused with salmon. The petals are narrow and beautifully twisted.

To Cactus Dahlia 'The Clown' (votes, unanimous), from Messrs. Keynes Williams. A showy variety with deep orange flowers heavily tipped with white.

To Pompon Dahlia 'The Duke' (votes, unanimous), from Messrs. Keynes Williams. The small well-formed flowers are of a rich shade of crimson maroon.

To Show Dahlia 'William Neate' (votes, unanimous), from Messrs. Keynes Williams. Flowers large and of good form, orange tipped with red.

To Fancy Dahlia 'Watchman' (votes, unanimous), from Messrs. Keynes Williams. The large yellow flowers are spotted and striped with crimson.

To Pompon Dahlia 'Iris' (votes, unanimous), from Mr. C. Turner, Slough. Pretty orange-coloured flowers shaded and tipped with mauve.

To Cactus Dahlia 'Antelope' (votes, unanimous), from Messrs. J. Burrell, Cambridge. Flowers rosy scarlet tipped with cerise; of medium size and good form.

To Cactus Dahlia 'Lucius' (votes, unanimous), from Messrs. J. Burrell. Flowers large and of good shape; colour rich orange red.

To Single Dahlia 'Leslie Seale' (votes, unanimous), from Mr. M. V. Seale, Sevenoaks. Flowers of medium size, pink, with a broad band of crimson round the yellow disc.

To Pompon Dahlia 'Snowflake' (votes, unanimous), from Mr. Seale. A handsome variety with pure white flowers.

To Pompon Dahlia 'Distinction' (votes, unanimous), from Mr. Seale. The neat rosy purple flowers, shaded with crimson, are thrown well above the foliage.

To Pompon Dahlia 'Demon' (votes, unanimous), from Mr. Seale. The small flowers are shapely, and of a rich shade of crimson.

To Show Dahlia 'David Johnson' (votes, unanimous), from Mr. G. Humphries, Chippenham. Flowers very large, pale buff, suffused with purple on the reverse of the petals.

To Cactus Dahlia 'Ranji' (votes, unanimous), from Mr. G. Humphries. This is perhaps the darkest Dahlia grown. The petals are long and narrow, deep maroon crimson tipped with purple.

Other Exhibits.

Miss Aldersey, Aldersey Hall, Chester (gr. Mr. C. Barnett), sent specimens of a richly coloured Cactus Dahlia named 'Empress of Austria.'

Mr. T. Notley, Thorpe St. Andrew, Norwich, sent flowers of bedding Pelargonium 'Thomas Notley,' a cross between 'Vésuve' and 'Nellie Thomas.'

Messrs. J. Veitch, Chelsea, sent a group of hardy flowering shrubs and ornamental grasses, amongst which were exceptionally well-flowered examples of *Abelia rupestris*, a charming shrub with white fragrant flowers; *Bignonia grandiflora*, *Caryopteris Mastacanthus*, and a few single and double flowered forms of *Hibiscus syriacus*.

Mr. G. St. Pierre Harris, Orpington, sent four varieties of Dahlias.

From Messrs. R. Veitch, Exeter, came two varieties of annuals.

Messrs. T. Cripps, Tunbridge Wells, sent *Caryopteris Mastacanthus candida*.

ORCHID COMMITTEE.

JULY 12, 1898.

HARRY J. VEITCH, Esq., in the Chair, and fifteen members present.

Awards Recommended :—

Silver Flora Medal.

To J. W. Temple, Esq., Leyswood, Groombridge (gr. Mr. E. Bristow), for a fine group of varieties of *Cattleya Warscewiczii*. There were forty-three plants, bearing together over 160 flowers,

Silver Banksian Medal.

To Herbert Hicks, Esq., Bramwood, Chelmsford (gr. Mr. Machar), for a noble specimen of *Dendrobium Dearei*, grown on for four years, and when shown bearing thirteen spikes. One pseudo-bulb bore three spikes with an aggregate of thirty-three flowers. (Fig. 88.)

Botanical Certificate.

To *Oncidium Jamiesoni*, from Sir Trevor Lawrence, Bart., Burford, Dorking (gr. Mr. W. H. White). A fine bright

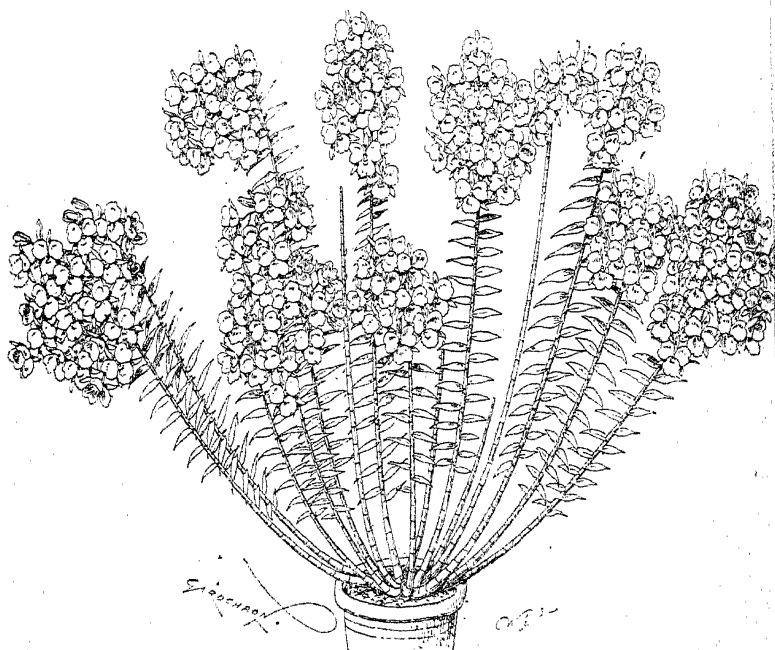


FIG. 88.—*DENDROBIUM DEAREI*. (*Gardeners' Chronicle*.)

yellow species having a white warted crest. The inflorescence also bore a few abortive flowers.

Cultural Commendation.

To Sir Trevor Lawrence, Bart. (gr. Mr. W. H. White), for a noble example of *Vanda* × *Miss Joaquim*, with fifteen flowers on a spike.

To Herbert Hicks, Esq., Chelmsford (gr. Mr. Machar), for *Dendrobium Dearei*.

Other Exhibits.

Messrs. Hugh Low & Co., Bush Hill Park, showed *Cattleya Gaskelliana alba* and other Orchids.

Sir Frederick Wigan, Bart. (gr. Mr. W. H. Young), showed *Cattleya Warscewiczii Rothschildiana*.

Baron Sir H. Schröder (gr. Mr. H. Ballantine), showed a good form of *Odontoglossum crispum Lehmanni*.

Mr. Wm. Bull, King's Road, Chelsea, showed *Oncidium macranthum Chelsiense*.

ORCHID COMMITTEE, JULY 26, 1898.

HARRY J. VEITCH, Esq., in the Chair, and thirteen members present.

Awards Recommended :—

Silver Flora Medal.

To W. G. Groves, Esq., Holehird, Windermere, for a noble specimen of *Odontoglossum coronarium* on 3 ft. raft, and bearing two fine spikes with over fifty flowers.

First-class Certificate.

To *Lælio-Cattleya* × *Ingramii gigantea* (*L. pumila* × *C. Dowiana*) (votes, unanimous), from Messrs. Jas Veitch & Sons, Chelsea. Flower nearly 8 in. across the petals; bright rose; lip dark purple. (Fig. 89.)

Award of Merit.

To *Masdevallia* × 'Imogen' (*Schlimii* ♀ *Veitchiana* ♂) (votes, 4 for, 3 against), from Messrs. Jas. Veitch & Sons. Form of flower and habit of producing several on a spike as in *M. Schlimii*. Colour yellow tinged with purplish red.

To *Lælio-Cattleya* × *Schilleriana*, 'Cambridge Lodge var.' (votes, 8 for), from R. I. Measures, Esq., Camberwell (gr. Mr. H. J. Chapman). Probably a second crossing of *L.-C.* × *Schilleriana* with *L. purpurata*. Flower white; sepals and petals tinged rose; lip very dark purple.

Other Exhibits.

Walter C. Clark, Esq., Liverpool, showed *Cypripedium* × 'Mrs. Walter Clark' (*Ashburtoniæ expansum* × *Stonei*), resembling *C.* × *Morgania*.

Messrs. F. Sander & Co., St. Albans, showed *Cypripedium* × 'Orion' (*Selligerum majus* × *Rothschildianum*).

G. W. Law-Schofield, Esq. (gr. Mr. Shill), sent *Cattleya Warscewiczii*.

Messrs. Jas. Veitch & Sons showed hybrid *Lælio-Cattleyas*.

Messrs. Hugh Low & Co. sent *Cattleya Gaskelliana alba* and other *Cattleyas*.

De B. Crawshay, Esq., Rosefield, Sevenoaks (gr. Mr. S. Cooke), showed *Cattleya Gaskelliana* 'Crawshay's var.,' of a uniform light-rose colour.

Norman C. Cookson, Esq., Oakwood, Wylam (gr. Mr. Wm. Murray), showed *Cattleya* × 'Lord Rothschild.'

ORCHID COMMITTEE, AUGUST 9, 1898.

HARRY J. VEITCH, Esq., in the Chair, and eleven members present.

Awards Recommended:—

Award of Merit.

To *Sobralia Sanderiana* (votes, unanimous), from Baron Sir H. Schröder, The Dell, Staines (gr. Mr. H. Ballantine). A fine species with flowers nearly as large as those of *S. macrantha*, but of a cream-white tinged with lilac, the disc of the lip orange colour, and the broad front portion rich claret-crimson.

To *Odontoglossum crispum Lehmanni*, 'Schofield's variety' (votes, unanimous), from Capt. G. W. Law-Schofield, New-Hall-Hey, Rawtenstall, Manchester (gr. Mr. Shill). A fine flower, of the round form, and flat, broadly ovate lip of the typical *O. crispum Lehmanni*. Sepals white, slightly tinged with rose, and each bearing from three to five ruby-red blotches. Lip ruby-red with a broad white dentate margin, and chrome-yellow disc with some purple lines. (Fig. 90.)

To *Cypripedium* × 'Olivia' (*tonsum* × *concolor*) (votes, 5 for), from Messrs. Hugh Low & Co., Bush Hill Park. In size and

form much resembling *C. tonsum*. Colour ivory-white with pink tinge. (Fig. 91.)

Other Exhibits.

Baron Sir H. Schröder (gr. Mr. Ballantine) showed the rare *Cypripedium Stonei platytænium*.

E. Zollinger-Jenny, Esq., Villa Greten, Wollishofen, near Zürich, sent *Vanda Sanderiana rosea*.

T. B. Haywood, Esq., Woodhatch, Reigate (gr. Mr. C. J. Salter), showed *Staurosis lissochiloides* (*Vanda Batemanii*).

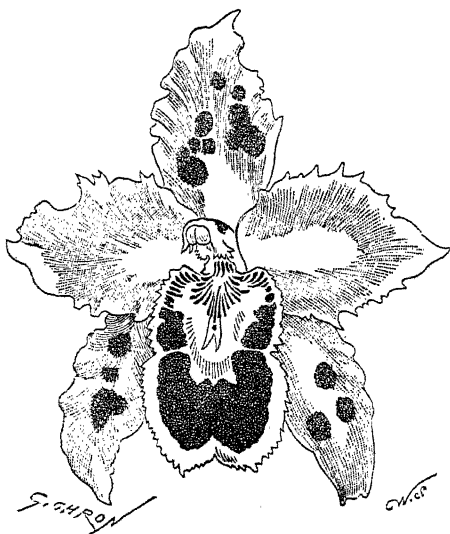


FIG. 90 —*ODONTOGLOSSUM CRISPUM LEHMANNI*. (*Gardeners' Chronicle*.)

Messrs. Hugh Low & Co. showed *Cattleya labiata Gaskelliana*, *Oncidium Papilio*, and other Orchids.

Capt. T. A. Julian, Woodside, Plymouth, showed a very singular pale form of *Cattleya Warscewiczii*.

Mr. James Douglas, Edenside, Great Bookham, showed *Dendrobium formosum*, 'Edenside variety.'

ORCHID COMMITTEE, AUGUST 23, 1898.

A. H. SMEE, Esq., in the Chair, and ten members present.

Awards Recommended :—

Award of Merit.

To *Disa* × *Diores* var. 'Clio' (*grandiflora* ♀ *Veitchii* ♂)

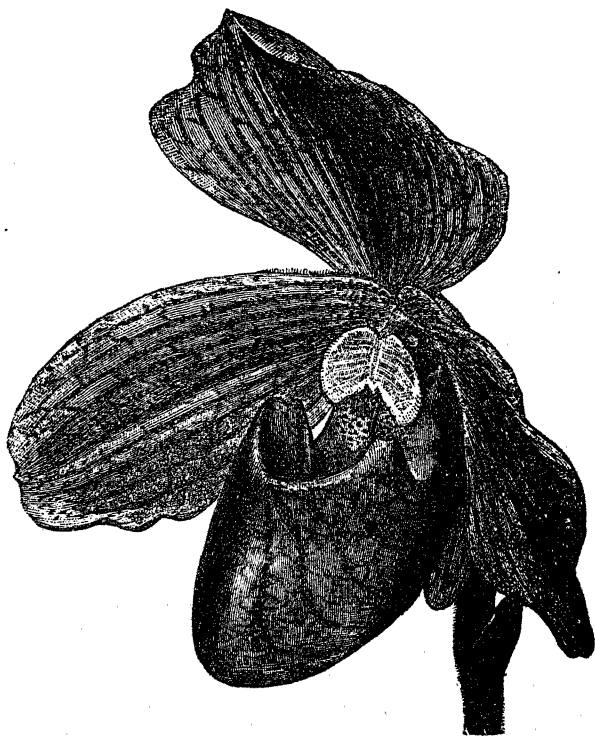


FIG. 91.—*CYPRIPEDIUM* × 'OLIVIA.' (*Journal of Horticulture*.)

(votes, unanimous), from Messrs. Jas. Veitch & Sons, Chelsea. Flowers closely approaching *D. grandiflora*, but in the different specimens varying from rose to rosy scarlet. (Fig. 75, page 332.)

Botanical Certificate.

To *Acineta Colossa*, from F. W. Moore, Esq., Royal Botanic Gardens, Glasnevin, Dublin. The raceme bore ten cream-white flowers, with purple spotting at the base of the petals and lip.

Cultural Commendation.

To Admiral Sir H. Fairfax, Melrose, N.B., for a fine form of *Odontoglossum Harryanum*, with eighteen flowers on the spike.

Other Exhibits.

Sir Trevor Lawrence, Bart., Burford (gr. Mr. W. H. White), showed a magnificent plant of *Platyclinis filiformis*, with over one hundred spikes, and the rare *Saccolabium Hendersonianum*.

Norman C. Cookson, Esq., Oakwood, Wylam (gr. Mr. W. Murray), sent *Cattleya* × *Hardyana*, raised at Oakwood.

G. F. Moore, Esq., Chardwar, Bourton-on-the-Water (gr. Mr. Morris), sent *Cypripedium leucochilum Mooreanum*.

Messrs. Jas. Veitch & Sons showed *Cypripedium* × *Rothschildiano-villosum*, *Masdevallia* × 'Circe' (*Veitchiana* ♀ *Schröderiana* ♂), and *Epidendrum* × *radicante-Stamfordianum*.

Walter Cobb, Esq., showed *Lælio-Cattleya intermedio-flava*.

Messrs. F. Sander & Co., St. Albans, showed *Bulbophyllum barbigerum*, *B. grandiflorum*, and other Orchids.

Messrs. Hugh Low & Co. showed a small group of Orchids.

Mr. Thos. Hogg, Paisley, sent *Cypripedium* × 'Lawrebel.'

Admiral Sir H. Fairfax showed *Cattleya* × *Hardyana*.

ORCHID COMMITTEE, SEPTEMBER 6, 1898.

HARRY J. VEITCH, Esq., in the Chair, and twelve members present.

Awards Recommended :—

Silver Flora Medal.

To Her Majesty the Queen (gr. Mr. Owen Thomas) for a magnificent specimen of *Peristeria elata* (Dove Orchid), grown in the Royal Gardens for many years, and when shown being about 8 ft. in height, and bearing eight very tall and stout flower spikes, having in the aggregate over 300 large fragrant white flowers.

To Messrs. Jas. Veitch & Sons, Chelsea, for a very effective group of Orchids, chiefly hybrids.

First-class Certificate.

To *Peristeria elata* (votes, unanimous), from Her Majesty

the Queen (gr. Mr. Owen Thomas). The fine old species had not before been certificated. On this occasion a gigantic specimen from the Royal Gardens, Frogmore, was staged.

Award of Merit.

To *Dendrobium sanguineum* (votes, 8 for, 1 against), from

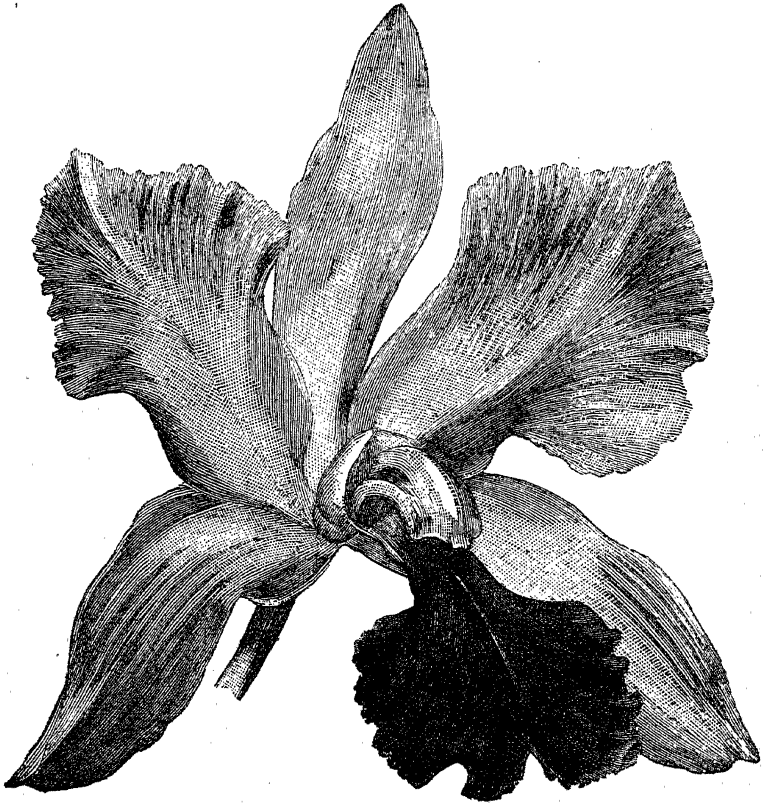


FIG. 92.—*CATTLEYA* × 'ELLA.' (*Journal of Horticulture*.)

Sir Trevor Lawrence, Bart., Burford. A slender Bornean species bearing a large blood-red flower in which the sepals and petals were nearly equal; the lip small.

To *Cattleya* × 'Ella' (bicolor ♀ *Warszewiczii* ♂), (votes, 11 for, 1 against), from Messrs. Jas. Veitch & Sons, Chelsea. A very

distinct hybrid with showy flowers, having the sepals and petals rosy-lilac; the lip, which resembled that of *C. bicolor* in form, blush-white at the base, the long isthmus between the base and front lobe, as well as the front lobe itself, being of a glowing purple colour, and having a narrow, fimbriated, lavender-coloured margin. (Fig. 92.)

Other Exhibits.

Edgar Cohen, Esq., Hall Road, St. John's Wood (gr. Mr. A. Vass), showed a fine form of *Lælio-Cattleya* \times *elegans* named 'Cohen's Variety.'

Messrs. F. Sander & Co., St. Albans, showed several hybrid *Cypripediums* and other Orchids.

O. O. Wrigley, Esq., Bridge Hall, Bury (gr. Mr. Rodgers), sent *Cypripedium* \times 'Mrs. F. L. Ames' (*Fairieanum* δ *tonsum* ϕ).

Sir T. G. Freake, Bart., Warfleet House, Dartmouth (gr. Mr. Marsh), sent *Dendrobium Phalænopsis*, 'Warfleet variety;' white, with some purple veining on the lip.

C. L. N. Ingram, Esq., Elstead House, Godalming (gr. Mr. T. W. Bond), showed *Lælia* \times *splendens*.

Messrs. Hugh Low & Co. showed *Cypripedium* \times *Palawanense*, imported from N. Borneo (? *C.* \times *Kimballianum*), said to be a natural hybrid between *Dayanum* and *Rothschildianum*.

ORCHID COMMITTEE, SEPTEMBER 20, 1898.

HARRY J. VEITCH, Esq., in the Chair, and fourteen members present.

Awards Recommended:—

Silver Flora Medal.

To Messrs. Jas Veitch & Sons, Chelsea, for a group of Orchids.

Silver Banksian Medal.

To C. H. Feiling, Esq., Southgate House, Southgate, N. (gr. Mr. F. Canham), for a group of *Dendrobium Phalænopsis Schröderianum* and other Orchids.

To Messrs. Hugh Low & Co., Bush Hill Park, Enfield, for a group of Orchids.

Award of Merit.

To *Miltonia* × *Binotii* (votes, unanimous), from Sir Trevor Lawrence, Bart., Burford, Dorking (gr. Mr. W. H. White). A supposed natural hybrid between *M. candida* and *M. Regnellii*. The plant bore seven spikes of pretty flowers. Sepals and petals cream-white, tinged with rose at the base and barred with cinnamon-brown; lip lilac with purplish base.

To *Miltonia* × *leucoglossa* (votes, unanimous), from Sir Trevor Lawrence, Bart. (gr. Mr. W. H. White). A natural hybrid, probably of *M. cuneata*. Sepals and petals cream-white, with irregular blotches of light violet; lip white.

To *Cattleya* × *intertexta* (*labiata* *Warnerii* × *Mossiae*) (votes, unanimous). A fine garden hybrid, intermediate in character between the two forms of *C. labiata* used in its production.

To *Lælia* × *splendens* (*purpurata* ♀ *crispa* ♂) (votes, unanimous), from Messrs. Jas. Veitch & Sons, Chelsea. This is the reverse cross of the variety previously shown, but similar to it. Interesting, as by it the suggestion that *L. × exoniensis* is of this parentage is disproved, although *L. × splendens* bears some resemblance to it.

Cultural Commendation.

To Mr. W. H. White (gr. to Sir Trevor Lawrence, Bart.), for a fine specimen of *Miltonia spectabilis*, with many flowers. Grown at Burford for some years.

Other Exhibits.

Frau Ida Brandt Riesbach, Zürich, sent *Angræcum Ellisii* and *Odontoglossum Lindleyanum*.

Messrs. F. Sander & Co., St. Albans, showed *Dendrobium atrovioleaceum* and other Orchids.

C. L. N. Ingram, Esq. (gr. Mr. T. W. Bond), showed *Lælio-Cattleya* × 'T. W. Bond' (*labiata* ♀ *purpurata* ♂) resembling *L.-C. × eximia*.

Jeremiah Colman, Esq., Gatton Park (gr. Mr. King), showed *Cattleya* × *Hardyana* 'Mrs. J. Colman.'

Mr. J. W. Moore, Rawdon, sent *Vanda cœrulea*.

1899.

Royal Horticultural Society.

NOTICES TO FELLOWS.

NOTICE IS HEREBY GIVEN that the ANNUAL GENERAL MEETING of the Fellows of the Society will be held at the Offices, 117 Victoria Street, Westminster, on Tuesday, February 14, 1899, at 3 P.M. precisely.

Letters.—All letters on all subjects should be addressed Secretary, Royal Horticultural Society's Office, 117 Victoria Street, Westminster. Letters sent to Chiswick have all to be sent up to Westminster to be answered.

Telegrams.—"HORTENSIA, LONDON" has been registered for the convenience of Fellows sending telegrams.

Tickets.—Fellows are reminded that their 1898 Tickets are available for the Meetings in January 1899. The Tickets for 1899 will be sent out early in January to all who have then paid their subscriptions. The book of *Arrangements for 1899* and the *Report of the Council and List of Fellows* will also be sent out in January.

Plants.—The list of Plants for distribution will be sent to every Fellow, enclosed in the Report of the Council, on about January 20, and will be the only one issued in 1899.

Subscriptions.—All Subscriptions fall due on January 1 of each year. To avoid the inconvenience of remembering this, Fellows can now *compound* by the payment of one lump sum in lieu of all further annual payments; or they can, by application to the Society, obtain a form of instruction to their bankers to pay for them every January 1. Fellows whose subscriptions remain unpaid are debarred from all the privileges of the Society; but their subscriptions are nevertheless recoverable at law, the Society being incorporated by Royal Charter.

Examination.—The Society's Annual Examination in the Principles and Practice of Horticulture will be held on Tuesday, April 11, 1899. Candidates should send in their names not later than March 1. In connection with the Examination, the Right Honourable Lord AMHERST (through the Worshipful Company of Gardeners) kindly offers a Scholarship of £25 a year.

Meetings and Shows, 1899.—The following are the dates fixed:—January 10, 31; February 14, 28; March 14, 28; April 18; May 2, 16; Temple Show, May 31, June 1, 2; June 13, 27; July 11,* 12,* 25; August 15, 29; September 12, 26; Fruit Show, Crystal Palace, September 28, 29, 30; October 10, 24; November 7, 21; December 5, 19; January 9, 23, 1900.

Notice of Meetings and Shows.—A reminder of every Show will be sent, in the week preceding, to any Fellow who will send to the R.H.S. Office, 117 Victoria Street, Westminster, 24 halfpenny postcards for 1899, *ready addressed* to himself.

Temple Show, May 31, June 1, 2.—The attention of Exhibitors is particularly directed to the Rules in the Book of *Arrangements*, 1899, which will be strictly enforced.

July 11, 12.—An International Conference on Hybrids, with Exhibition, will be held at Chiswick on July 11. The Conference will be continued on July 12 at 117 Victoria Street, S.W.

Dinner of the Society.—On July 12, at the Whitehall Rooms, Hôtel Métropole. Fellows wishing for Tickets, for ladies or gentlemen (price 21s.), should apply to the Secretary, 117 Victoria Street, before July 1.

Great Show of British-grown Fruit, September 28, 29, 30.—Fellows are particularly requested to subscribe a small sum towards the Prizes, as £100 must be raised before April. See pink fly-leaf enclosed.

Lectures, &c.—Any Fellows willing to Lecture or to communicate Papers on interesting subjects are requested to communicate with the Secretary.

* July 11 at Chiswick, July 12 at 117 Victoria Street

New Fellows.—The Secretary makes a special appeal to all Fellows to assist in promoting the welfare of the Society by doing all in their power to **introduce new Fellows.**

Poppy Seed.—The Secretary will be pleased to send a packet of his specially selected 1898 Shirley Poppy Seed to any Fellows who like to send to Rev. W. WILKS, Shirley Vicarage, Croydon, a stamped envelope ready addressed to themselves. The seed should be sown as early as possible in March.

Advertisements.—Fellows are reminded that the more they can place their orders with those who advertise in the Society's publications the more likely others are to advertise also, and in this way the Society may be indirectly benefited.

INDEX TO ADVERTISEMENTS IN THE PRESENT ISSUE.

THE FIGURES REFER TO THE PAGES WHICH ARE NUMBERED AT THE BOTTOM.

- Azaleas.—Cuthbert, 17.
- Bamboos.—Gauntlett, 14; Veitch, 31.
- Banks.—Birkbeck, 17.
- Begonias.—Davies, 24.
- Boilers.—Foster & Pearson, 27; Hartley & Sugden, 7; Thames Bank Iron Company, 21.
- Books.—Simpkin & Marshall, 13.
- Bulbs.—Ant. Roozen, 6; Wallace, 9.
- Ferns.—Birkenhead, 25.
- Fruit Trees.—Bunyard (Cover); Cheal, 23; Pearson, 11; Rivers, 8.
- Greenhouses.—Crispin, 4; Crompton & Fawkes, 32; Mackenzie & Moncur, 29; Messenger, 16; Tucker, 15; Weeks, 19; Wood, 26.
- Iron Fencing.—Bayliss & Jones, 20.
- Labels.—Leeds Orchid, 8; Pinches, 17.
- Manures.—Anglo-Continental, 18; Brown & Co., 12; Clay, 22; Cross, 23; Nitrate, 6; Thomson, 10.
- Mats.—Wassilieff, 17.
- Newspapers.—*Gardeners' Chronicle*, 1.
- Pansies.—W. Sydenham, 30.
- Rose Trees.—Mount, 20; Paul, 28; Rumsey, 23.
- Sarracenias.—Bruce, 23.
- Seeds.—Barr, 5; Carter (Cover); Rains, 14; Sutton (Cover); R. Sydenham, 3.
- Stakes.—Porter, 17.
- Summer-houses.—Riley, 28.
- Tents.—Unite, 14.
- Trees and Flowering Shrubs.—Cooper, 16; Dicksons, 9; Jackman, 13.
- Weed Killers.—Acme, 2; Tomlinson & Hayward (Inset).

EXTRACTS FROM THE PROCEEDINGS

OF THE

ROYAL HORTICULTURAL SOCIETY.

GENERAL MEETING.

OCTOBER 11, 1898.

Rev. W. WILKS, M.A., in the Chair.

Fellows elected (24).—Miss G. Ball, H. L. T. Blake, J. S. Bridger, G. Caselton, A. de Lafontaine, Henry Furze, G. T. Lane, Miss W. Lewis, C. H. Lorkyn, Mrs. Eva McLaren, W. Scott Miller, Mrs. Nicholas, Richard Paget, John L. Peter, H. G. Poland, G. Pritchard, F. W. Saunders, Lady A. Shaw-Stewart, Charles Steel, B. C. Thomasset, Mrs. Thomasset, Capt. C. Shepherd, Rev. G. F. Whidborne, James Wright.

Societies affiliated (2).—Canterbury (New Zealand) Horticultural Society, Eastbourne Horticultural Society.

A lecture on "Some of the Plants Exhibited" was given by the Rev. Prof. Geo. Henslow, M.A., V.M.H. (See p. 441.)

GENERAL MEETING.

OCTOBER 25, 1898.

Dr. MAXWELL T. MASTERS, F.R.S., in the Chair.

Fellows elected (20).—Harry C. Braham, T. R. Bruce, Mrs. W. Burns, R. C. Cartwright, Geo. Caswell (U.S.A.), E. Stanley Clarke, George Cooper, G. Fenwick, C. B. Gabriel, Mrs. Hankey, Andrew Motion, Mrs. W. Paget, Richard Reid, Mrs. S. M. L. Shrubbs, Hon. Mrs. Freeman-Thomas, R. D. Turner, W. F. Ward, Miss Vulliamy, Justin Vulliamy, Lady M. Watney.

Society affiliated (1).—Colchester Rose and Horticultural Society.

A lecture on "Experimental Horticulture" was given by Mr. Geo. Gordon, V.M.H. (See p. 443.)

GENERAL MEETING.

NOVEMBER 8, 1898.

Dr. MAXWELL T. MASTERS, F.R.S., in the Chair.

Fellows elected (16).—Mrs. M. K. Barnes, Miss H. M. Bevis, G. W. Brookbank, Miss C. Hay Currie, W. Elphinstone, Joseph Hobson (South Africa), Mrs. A. Hughes, Miss Lucy E. Jones, W. Macdonald, W. Millwood, Miss Ida Sharpe, Mrs. Shaw, A. C. Wilkin, Jas. E. B. Wilson, A. Wyatt, Samuel Yarde.

A lecture on "Some of the Plants Exhibited" was given by the Rev. Prof. Geo. Henslow, M.A., V.M.H. (See p. 453.)

GENERAL MEETING.

NOVEMBER 22, 1898.

Mr. CHAS. E. SHEA in the Chair.

Fellows elected (20).—F. W. Badcock, Charles Bayer, James A. Burness, Maurice H. Cazalet, Mrs. Francis Cobbold, Fredk. P. Colliver, Benjamin Daniel, Mrs. Denny, W. H. Hackblock, Capt. Hartley, E. J. Jekyll, Edward M. Nelson, Mrs. Norman, Charles Peters, C. H. Ratsch, W. L. Seyfang, Fred Smith, Sir W. Smythe, J.P., H. M. Tod, W. J. Trickers.

A lecture on "Artificial Garden Manures" was given by Mr. A. D. Hall. (See p. 469.)

GENERAL MEETING.

DECEMBER 13, 1898.

Mr. JOHN BRADSHAW in the Chair.

Fellows elected (28).—W. Ansell, H. H. Baber, Mrs. Ball, J. S. Berghem, Mrs. A. T. Bevan, Frank Bibby, Harold Brown, W. E. Bryant, Mrs. J. F. Bullar, Mrs. L. Bulteel, John R. Burton, Mrs. E. R. Chilton, Norman Davis, Mrs. Eadon, W. H. Greville Edwards, Col. Philip H. Freelove, Sir John Gladstone, Bart., James Green, Esq., Mrs. G. A. Kessler, Percy Lake-Hope,

Mrs. Littlewood, Mrs. F. H. Lyell, F. G. Monkland, William E. Nicholson, George C. Robertson, Mrs. D. Smallpeice, William A. Sturrock, Dr. John A. Wilson.

Society affiliated (1).—Kingston and St. Andrew's (Jamaica) Horticultural Society.

A lecture on "Some of the Plants Exhibited" was given by the Rev. Prof. Geo. Henslow, M.A., V.M.H. (See p. 486.)



FIG. 118.—MILTONIA \times BINOTII ; see page clxvii. (*Gardeners' Magazine*.)

SCIENTIFIC COMMITTEE.

OCTOBER 11, 1898.

Dr. M. T. MASTERS, F.R.S., in the Chair.

Present: Dr. H. Müller, Rev. W. Wilks, and Rev. Prof. G. Henslow, Hon. Sec.

Pear Leaves Diseased.—With reference to some leaves sent since the last meeting, Prof. William G. Smith, of Leeds, reports as follows:—

“The Pear leaves with rusty spots are attacked by a *Ræstelia*, one of the group of *Uredineæ*. This fungus is one which completes its life-history on two host-plants. The leaves submitted are those of one host—the Pear. They bear two distinct kinds of rusty spots or areas—viz. smooth areas in which the leaf-tissue is almost normal, and swollen areas in which the leaf-tissue is abnormally increased and full of starch. The smooth spots are studded on the upper surface with black points, the ‘pycnidia’ or ‘spermatia’; as a rule, these were covered with a hardened film of what had been sticky masses of ejected conidia, generally blackened with smut or bearing saprophytic fungi. The swollen pustular areas also bore spermatia on the upper surface, and also partially developed æcidium cups embedded in the abnormally increased tissues of the lower half of the leaf. The imperfect development of these æcidia prevents me from identifying the species of *Ræstelia* exactly: it is probably *R. cancellata*. This fungus may also attack the fruit. The second host of this ‘rust’ is the Savin (*Juniperus Sabina*), and it would be useful to know if this or an allied *Juniperus* occurs in this garden; also if they were perfectly healthy. The rust is a common source of trouble, especially a form which occurs on Apple-trees. This latter is very injurious in the United States. American authorities advise removal of the second host, the Juniper; also the destruction of badly diseased trees or branches. After these precautions are carried out, Bordeaux Mixture is said to give good results. It is used in two or three sprayings at intervals of eight to ten days, the first given as soon as the young foliage appears. It is also strongly urged to use varieties of Apples or Pears suited to resist the rust.

These, of course, vary for different soils, and must be found out after making the necessary experiments in the locality where they are wanted."

Apple Diseased.—This was received from Mr. A. H. Pearson, Chilwell, Notts. Professor William G. Smith reports as follows:—

"The Apple sent me shows a 'fruit-rot.' The primary cause is a fungus (mycelium) present in all the discoloured areas, but I should like to see other specimens before saying definitely what is the species. Several fungi have the same action in discolouring and softening the fruit; most of them also cause it to crack. When the flesh is exposed, then the white and blue moulds present on the specimen make their appearance. They are common mould-fungi (*Penicillium glaucum* and a *Mucor*, probably *M. piriformis*), and are not the cause of the trouble—at least, they have not yet been proved so by anyone. The primary fungus is the one which has to be dealt with by remedies. The best preventive is probably Bordeaux Mixture. It has been used in the United States, and the results obtained appear satisfactory. The Mixture is applied as a fine spray: the first application when the young foliage appears, the second after the fruit has set, the third two weeks later, and perhaps a fourth somewhat later. In this case, where the Apples are grown under glass, much might be done to hinder the progress of the fungus by free ventilation and dry air. The Apple sent seems to be a fine-skinned variety; hence it is all the more susceptible to fungus attack."

Apple with "Glassiness."—The Apples received from Mr. J. Vert, gardener at Audley End, have a peculiar translucent appearance. This is due to water having penetrated the inter-cellular spaces instead of air. No fungus is present, but the cause of the transfusion of water is not known. This glassiness is said to be highly esteemed in Italy.

Dahlias Crossed by Sunflower.—Mr. E. J. Lowe, F.R.S., forwarded blossoms having a true Dahlia appearance, which he believes to be raised from seeds of a parent the issue of the above cross. Nothing, however, excepting a rather large disc appeared to indicate a cross. The relationship between a Dahlia and a *Helianthus* being relatively remote, any *à priori* probability of such a cross being effected is but slight. In experimenting it would be extremely difficult to prevent

self-fertilisation, unless it be proved that the pollen is self-impotent in Dahlias.

Potato Decayed.—Samples were received from Mr. Veitch having peculiar outgrowths, and being much decayed within, probably from the attacks of *Peronospora*. They were forwarded to Professor William G. Smith for further investigation. Mr. Veitch described the presence of the disease as follows:—"It was first detected early in August, before we had much hot weather; and this is the only garden in the neighbourhood so affected."

Cure for the Lily Disease.—Mr. Horace Byatt, of the Grammar School, Midhurst, Sussex, writes to say that he has found flowers-of-sulphur to be an excellent remedy for this troublesome fungus. "In the autumn of 1896 I removed some sets of bulbs from the ground, and when they were somewhat dry I put them, a few at a time, into a large brown-paper bag, in which was a supply of flowers-of-sulphur. They were then well shaken until the powder got thoroughly into the crevices, after which they were planted. Last season they showed a marked improvement in the blossom-heads, which were weakly, though almost free from disease; and now I have the pleasure of seeing them perfectly healthy, with fine green stems and leaves, promising good blossoms, while the rest of the sets have not a single blossom."

Colours of Flowers and Drought.—Rev. W. Wilks made the following observations on the colouration of flowers of the present season. Similar changes were recorded in *Nature* last year by Mr. Hughes-Gibbs, of Tarrant Gunville, Dorset:—"All through the exceptionally hot weather of the end of July and August all scarlet flowers had a tinge of dull-brown in them, pink had a shade of orange, yellow was very yellow, white was creamy. This was very marked—*e.g.* in Dahlias. Thus, Fire King and Sunset, two ordinarily bright, clear, scarlet flowers, had a distinct dull-brown tint overlying and spoiling utterly the usual scarlet, so much so that, having been away from home the first three weeks of the heat, I thought on my return that the Dahlias must have somehow got wrongly named. But now the weather is cooler the bright scarlet has come back, and the dull brown tint has gone, and all is as usual. The only colours the heat seemed (to me) to suit were the salmons, and they have

been very fine and intense, having a sort of glow added to them."

West Indian Junipers.—Dr. Masters showed specimens of a Juniper, native to Jamaica, which he had received through the kindness of Mr. W. Fawcett, the Government botanist of the island. This species had been referred to the *J. bermudiana* of Linnæus, with which *J. barbadensis* of the same author is taken to be synonymous. On comparison the Jamaica Juniper is seen to agree very closely with *J. virginiana*, the so-called Red Cedar of the mainland of North America from Canada to Florida. This species furnishes the best "cedar" wood for pencils, and many beautiful forms of it are cultivated in English gardens. The resemblance of the Jamaica plant to the American is so close that Dr. Masters does not hesitate to include them both under the same name of *J. virginiana*. Dr. Masters also showed specimens and wood of the true Bermuda Juniper, received from A. Haycock, Esq. The history of this plant, which differs greatly from the preceding, was cleared up by Mr. W. B. Hemsley in the *Gardeners' Chronicle*, May 26, 1883, p. 657.

Tomatos with Bulbiferous Stems.—Mr. Wilks exhibited specimens of Tomato plants, grown against a wall, which bore small bulb-like protuberances along the midribs and subsidiary branch ribs of the leaves. From each bulb proceeded a small leafy shoot. An anatomical examination showed that they were formed by an excessive growth of cortex and medulla, the fibro-vascular cylinder being somewhat enlarged as well. It was suggested that experiments should be made of growing the shoots from the bulb-like processes, to see if they would give rise to a perennial form.

SCIENTIFIC COMMITTEE, OCTOBER 25.

Dr. M. T. MASTERS, F.R.S., in the Chair.

Present: Mr. Bennett-Poë, Rev. W. Wilks, and Rev. Prof. G. Henslow, Hon. Sec.

Cypripedium insigne, Malformed.—A flower was received from Mr. R. Keeble, of The Gardens, Twyford, Berks, remarkable for being in a very arrested state. The front sepals were nearly separate, not coherent as usual. The posterior sepal was

normal, the petals were present, but no pistil, a solid column occupying the centre of the flower, with an abortive stigma at the summit.

Fruit of Diospyros Kaki.—Canon Ellacombe sent some specimens “from a tree growing against a south wall, but never protected, which has been there at least a dozen years, and possibly more.”

Victoria Plums, Second Crops.—Both Mr. Marshall, of Bexley, and Mr. Addington, of Ford House, St. Neots, sent samples of ripe Plums of this variety as second crops. Mr. Addington remarks:—“The tree off which I gathered them had an enormous crop of Plums early this year, and it has now a good quantity of a second crop.” It is, of course, an unusual occurrence, but the result of the prolonged summer weather.

Lilium speciosum with Petaloid Stamens.—A blossom was received from Mr. E. H. Jenkins, of the Queen’s Road Nursery, Hampton Hill, remarkable for the exterior (sepaline) stamens being completely changed into perianth-leaves, resembling the others in every way.

Chrysanthemums Damping off.—Mr. Saltmarsh, of Chelmsford, sent some cut flowers of Chrysanthemums, in which the lower part of the blossom was arrested in growth from internal decay. It was the general opinion that this was due to too gross feeding and a too confined air. Flowers-of-sulphur might correct it if the other conditions were attended to.

SCIENTIFIC COMMITTEE, NOVEMBER 8.

Dr. M. T. MASTERS, F.R.S., in the Chair.

Present: Rev. W. Wilks, Mr. Michael, Prof. Church, and Rev. Prof. Henslow, Hon. Sec.

Potatos with Scab.—With reference to the diseased tubers received from Mr. Veitch on October 11, Dr. W. G. Smith, of Leeds, reports as follows:—

Almost simultaneously with receipt of specimens from the Scientific Committee, other specimens were received from the *Gardeners’ Chronicle*. Both sets of material showed a well-marked form of “scab,” involving the tip or growing end of

every tuber. Freshly-cut sections showed a mycelium inside the tubers, both in discoloured and normally coloured parts. The first result of cultivation was an abundant crop of a *Mucor* (white mould), which soon passed into the zygospore resting stage. An abundant crop of bodies of a fungus nature were also present about this time in active growth. Later several other fungi appeared. The rotten parts showed the presence of bacteria, white mites, and nematode worms. *Phytophthora* was not met with in course of the examination.

The "scab" disease has been ascribed to (1) various fungi; (2) bacteria; (3) nematode worms; (4) mites; (5) an organism of a slime-fungus nature (*Pseudocommis*). The material examined was not suited to discriminate the actual cause of the disease, because four of the above agencies were present in company. The presence of a fungus mycelium in freshly exposed sections inclines me to give the precedence to some fungus. In the cases examined, moss-litter from a stable was used largely in one case; the other had also been manured with moss-litter manure, but the source and quantity are not stated. This would seem to indicate that such manure offered good nourishment to the fungus. Comparing my results with other cases recorded, I am inclined to think that the fungus (another cause) came from the soil.

Investigations on Potato-scab have been often made in the United States, Belgium, Germany, and France. No definite cause has as yet been fixed on, but experiments in preventive treatment have been fairly successful. Of the latter the following have been tried in the United States and in Europe:—

1. Corrosive sublimate—the favourite substance used in the United States. When seed-tubers are treated before planting out with one part of the sublimate in 1,000 of water for one to two hours, good results generally follow, although some experiments on badly infested land were negative.

2. Sulphur—also a favourite American remedy. The seed-tubers are thoroughly dusted with flowers-of-sulphur before planting. One authority speaks highly of good results from 300 lb. of sulphur per acre applied in the open row, like artificial manures, from a drill distributor. The same writer is also in favour of a mixture of sulphur and kainit at the rate of 300 lb. per acre.

3. Kainit, for application to land known to be infested. This seems to me a safe cure, and it is favourably reported on.

Fruiting of Akebia quinata.—Foliage and ripe fruit of this berberidaceous climber were received from the Dowager Lady

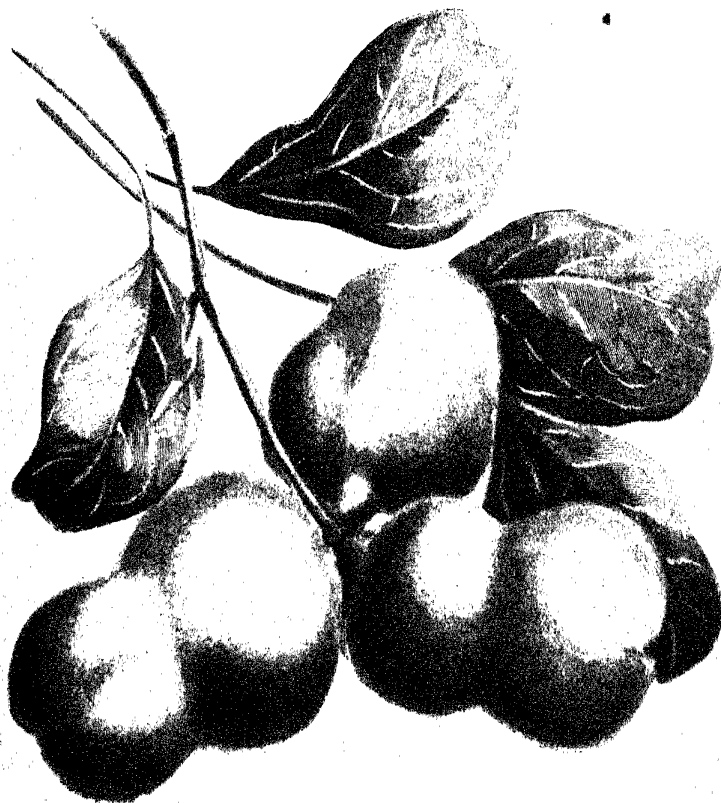


FIG. 119.—FRUIT OF *AKEBIA QUINATA*. (*Journal of Horticulture*.)

Bowman. They were grown in the open at Joldwynds, near Dorking. It is a native of Japan, and, as a rule, does not perfect its fruit in this climate. It is bisexual. The colour of the fruits is a curious shade of lilac-brown covered with a white bloom. (Fig. 119.)

Cyclamen europæum with long Rhizomes.—Some plants were sent by Rev. C. Wolley Dod, showing how this plant can produce its tuber several inches below the surface by means of a long rhizome penetrating vertically through the surface-soil. At the base of the rhizome was the globular tuber. Perhaps this may have resulted from the long drought, so that the tuber might be produced away from its influence.

Proliferous Teasel Head.—Dr. Masters exhibited a specimen in which the bracts of the summit had become foliaceous. An examination by Mr. Massee of the tissues showed the presence of the fungus *Sclerotinia libertiana*, both the sclerotia and the botrytis form being present. The probability is that the fungus had stimulated the bracts into their abnormal growth.

Cankered Apple-trees.—Dr. Masters also exhibited branches of Apples swollen by Mistletoe, but within cracks of the bark there was present the fungus *Nectria ditissima*. He remarked that by removal of the grass, thorough loosening of the soil about the roots by forking it over, and by applying manure, the canker had disappeared from the trees so treated.

Lavender with Dimorphic Leaves.—Dr. Masters called attention to sprays of Lavender on which the majority of the leaves were small, grey, with stellate hairs, and with inrolled margins, these characters being acquired by many plants frequenting arid and hot regions. Some of the leaves, however, were much larger, dark green, and flat, such being characteristic of plants in a moister climate. The different appearance of the latter is caused, according to Professor Henslow, by there being much fewer hairs, and these, instead of having long and very slender branching rays, have only extremely short ones, with scarcely any branches; consequently they scarcely overlap each other, and so reveal the green chlorophyll below and between them. With regard to the stomata, they are about equally and very sparingly distributed. They occur on both sides of the leaves.

Potatos blackening when Boiled.—Mr. Rd. Morse forwarded raw and cooked Potatos, to show the difference in those cooked, as grown in a field and in the garden. The latter were much blackened, but not the former. They were the variety Windsor Castle. The soil of the field sent was very red from the presence of iron; consequently there was very little doubt that the tannic acid, being liberated by boiling, united with some salt of

iron imbibed, producing tannate of iron, the usual ingredients of ink. Beyond being somewhat unsightly, nothing of a deleterious character was present. Mr. Michael observed that it was of common occurrence in the peaty soils of Skye, and that the Potatos were even preferred so by the local inhabitants.

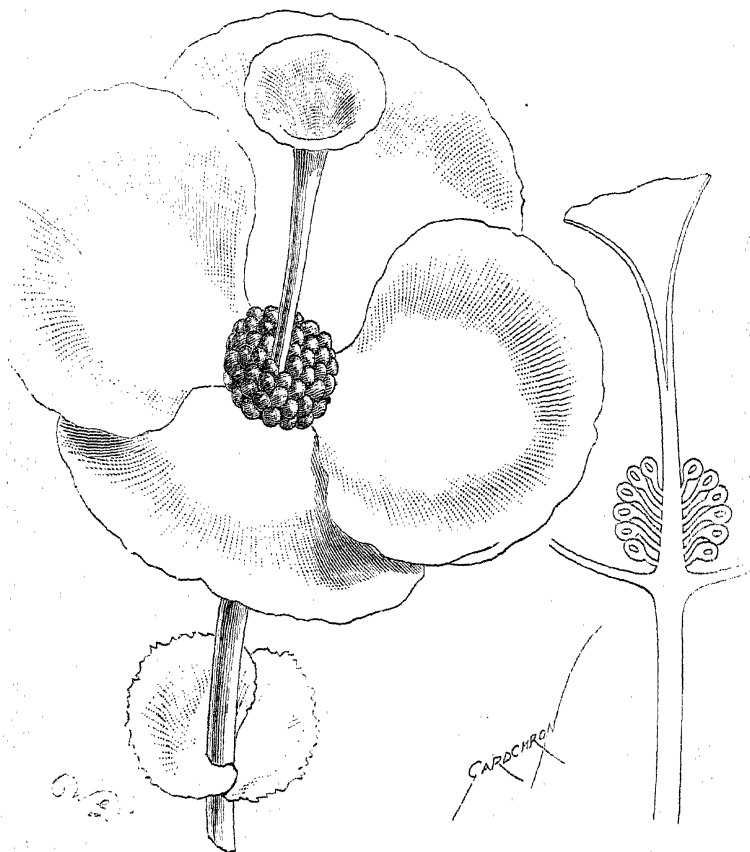


FIG. 120.—MONSTROUS BEGONIA. (*Gardeners' Chronicle*.)

A Monstrous Begonia.—Dr. Masters showed a male flower, in which the central axis was prolonged into a small funnel-shaped structure on a slender pedicel (see fig. 120). Similar structures are not uncommon, as foliar excrescences from the ribs of Cabbage-leaves, and the ovules of Mignonette have

been transformed into similar funnels or cups, as described by the late Rev. Prof. J. S. Henslow.

Structure of the Seeds of the Indigo Plant.—Professor Church alluded to a curious discovery he had made in investigating the seeds of some wild species of Indigofera, as *I. linifolia*, *I. cordifolia*, and others. He found that sections of the embryos showed a marbled surface, having brownish patches, due to the colouring matter erythrophyll. On boiling crushed seeds to test for starch, not any was found, 33 per cent. being albuminoid matter; hence these are the most nitrogenous of all leguminous seeds known. On the solution being left, the true indigo-blue separates and becomes insoluble. Thus, there are two quite independent colouring matters in the same seed. The solution being red, the blue formed a ring round the porcelain vessel containing it.

SCIENTIFIC COMMITTEE, NOVEMBER 22.

Dr. M. T. MASTERS, F.R.S., in the Chair.

Present: Mr. Bennett-Poë, Rev. W. Wilks, Mr. Michael, and Rev. Prof. Henslow, Hon. Sec.

Tea-plants overrun by Mites.—Mr. Michael gave an interesting account of a new species of *Acarus*, sent by Mr. E. E. Green, Hon. Gov. Entomologist, of Eton, Pundaluoya, Ceylon. They were forwarded in tubes filled with sterilised air, a plan which Mr. Green had found very useful for preserving fleshy insects in their natural form and colours. He also forwarded specimens of young Tea-leaves attacked by the mite, which causes considerable damage and loss of crop on the Tea estates in Ceylon. Mr. Green writes as follows:—"Some years ago I gave a description and figures of this mite in a little pamphlet on "Insect Pests of the Tea Plant." For purpose of registration I gave it the provisional name of *Acarus translucens*, but I find that this name is already occupied by a different mite, described by Nietner in his "Enemies of the Coffee-tree"; therefore the insect is still nameless. I should be glad to have it properly identified. It is curious in laying two different kinds of eggs, one form being quite smooth, and another form rather larger and beautifully beaded. The latter is the more

usual, and I have watched the emergence of the mite from this egg. I have only recently noticed the smooth eggs. The immature insects are very sluggish, the mature ones decidedly active. They attack the young leaves only. As each bud unfolds they move up on to it, deserting the older leaves, which, however, are permanently injured. The attack of the mite imparts a brown scaly character to the leaf cuticle, which persists throughout its life. When the unopened leaf-bud is attacked, the punctures are concentrated upon the groove and the infolded edges. This forms a permanent scar, appearing like a strong sub-lateral nervure on the expanded leaf."

Mr. Michael observed that the mite was one of the *Tarsonymi*, a group only lately known, but proving to be great destroyers of vegetation—*e.g.* the Box-trees in the Turin Botanic Garden were all destroyed in one season. Professor Canastrini, of Padua, discovered that the mite bored beneath the epidermis of the leaf. Another species attacks the Sugar-canes of Barbados, where it is less injurious, though fresh Canes swarmed with the *Tarsonymi*. Few species are known as yet, but they are very destructive. They are extremely minute, and have consequently escaped detection until the last few years.

Dahlia crossed with the Sunflower.—Mr. Lowe, F.R.S., sent fresh examples of his supposed hybrid. They were very much arrested in growth and malformed, but they would otherwise be regarded as Dahlias. It may be observed that M. Martin Cahuzac attempted to cross the Dahlia with the Chrysanthemum, but in his case, as with Mr. Lowe, the supposed hybrid did not appear to be very marked. (*Gardeners' Chronicle*, Dec. 11, 1897, p. 417.)

Pear-within-Pear.—Mr. W. J. Clarke, Manor House, Benbrook, Market Rasen, sent an example of this not uncommon monstrosity, and Mr. Bennet-Poë brought another example. The Pear has no core, but in its place the apical bud develops into another pseudo-Pear; the terminal bud then attempts to produce a third or more; finally a tuft of small leaves at the top represents the still growing terminal bud.

Pyrus crenata.—Dr. Masters remarked that this tree is peculiar for retaining its large and handsome leaves for a time, after most other deciduous trees have shed theirs. The leaf exhibited was from a tree in a garden at Ealing. It is a native

of Nepaul, and a figure was given in the *Gardeners' Chronicle*, January 3, 1874, p. 17.

SCIENTIFIC COMMITTEE, DECEMBER 13.

Dr. M. T. MASTERS, F.R.S., in the Chair.

Present: Mr. Veitch, Mr. Michael, Dr. Müller, Mr. Bennett-Poë, Mr. A. Sutton, Professor Church, Rev. W. Wilks, Mr. Titheradge (from Australia), and Rev. Professor Henslow, Hon. Sec.

Award Recommended :—

Botanical Certificate.

To *Begonia vanosa* (votes, unanimous), from Gilbert Christy, Esq., Carshalton. A most interesting new species. (See below.)

Other Exhibits.

Prunus lusitanica, var. *azorica*.—A spray with fruit of this variety of the Portugal Laurel was shown, having been sent by Miss Breton, Forest End, Sandhurst. Mr. Veitch observed that as a garden variety it had no special merit, but rather the reverse, in consequence of its more straggling habit.

Narcissus pachybolbos.—With reference to this species, Mr. Titheradge remarked that it grows freely in Australia, though it is one rarely cultivated in this country. It is a native of Algeria.

Narcissus viridiflorus.—A flower of this rare and curious little species was sent by Mr. Kingswell, of Harrow Weald. It is an autumn-flowering species, rarely cultivated, but, according to Paxton, introduced from Spain or Barbary in 1629. The blossom is very small and entirely green.

Begonia venosa, Skam.—A new species from Brazil, with a remarkable habit and large leaves, densely tomentose below and furfuraceous, with substellate hairs above. The flowers are small, and of a pinky white tint. It was received from Mr. Gilbert Christy, F.L.S. It had been raised from seed procured by Professor Löfgren on an island near Para.

Asparagus Sprengeri.—Introduced from the Cape about four years ago: it was exhibited by Mr. May. Two varieties,

raised without crossing, have already appeared—viz. *compactus* and *densissimus*. It is an interesting species in that the “needle-like” structures of the garden *Asparagus* are in this species represented by genuine leaves, revealing the true nature of the former.

Caterpillars.—Some living specimens of three species were received from Miss L. H. Paterson (Edinburgh) and forwarded to Mr. McLachlan, who reports as follows:—“One of the caterpillars (brown) is the larva of one of the ‘rove’ beetles (*Staphylinidæ*). They are mostly carnivorous, or feed upon decaying vegetable matter, so that they are generally beneficial. The other (a white one) is the larva of *Hepialus sylvinus*, one of the ‘Swift moths.’ The ‘ghost moth’ is of the same genus. It is destructive to the roots of anything herbaceous. The third was the larva of one of the *Noctua* moths, probably *Agrotis segetum*. It is very destructive, and feeds chiefly at night. It has nothing whatever to do with the cockchafer, which it was thought to resemble. The above are all general feeders. It might be as well to lift the plants where they occur and supply fresh earth, charring the old. Insectivorous birds should be encouraged. A dressing of gas lime, repeated several times, might do good, but it should be used cautiously.”

Apple-tree Diseased.—Mr. Bunyard sent a small branch curiously affected, with the following observations:—“The branch was sent to me by Rev. A. Foster-Melliar, in whose garden the tree grows. When the branch was cut it was in a pappy floccose state: this appearance had suddenly broken out in a tree grafted two years ago. It probably arose from strong unmaturing wood being over-fed with stimulants. The tree had made a very gross growth.” The specimen was forwarded to Dr. W. G. Smith for further examination.



FRUIT AND VEGETABLE COMMITTEE.

OCTOBER 11, 1898.

PHILIP CROWLEY, Esq., in the Chair, and eighteen members present.

Awards Recommended:—

Silver-gilt Knightian Medal.

To Messrs. Bunyard, of Maidstone, for 100 dishes of Cooking Apples.

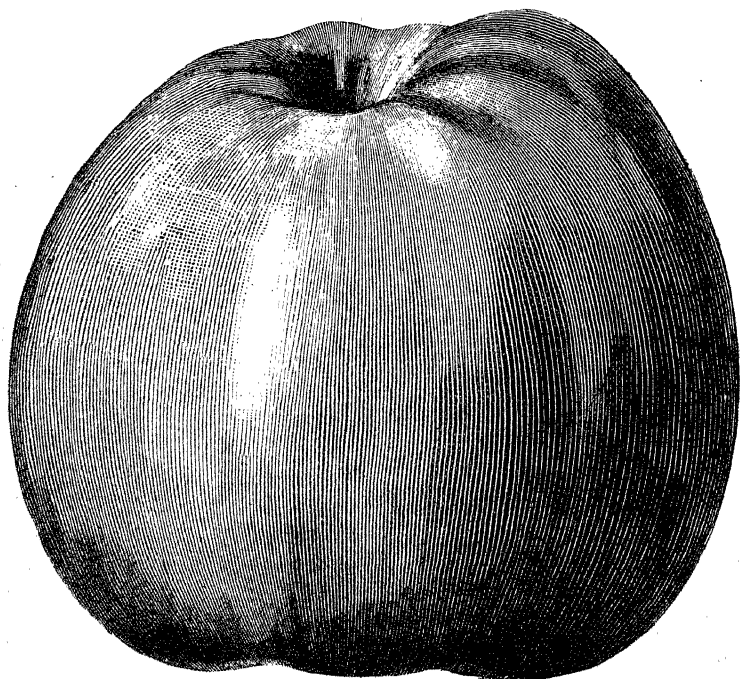


FIG. 122.—APPLE 'INVINCIBLE.' *(Journal of Horticulture.)*

To Martin R. Smith, Esq. (gr. Mr. Blick), Hayes, for a collection of Pears.

Silver Knightian Medal.

To the Dowager Lady Freake (gr. Mr. Rickwood), Fulwell Park, for Apples and Pears.

To Messrs. Cannell, of Swanley, for Onions.

Silver Banksian Medal.

To Mr. Green, of Wisbech, for Potatos.

Award of Merit.

To Melon 'Gunton Scarlet' (votes, unanimous), from Lord Suffield (gr. Mr. Allan), Gunton Park. It is the result of a double cross, 'Austin's Incomparable' \times 'Hero,' and the resulting fruit again crossed with 'Blenheim Orange.' It has the quality of 'Austin's,' the high flavour and skin of 'Hero,' and the scarlet flesh of 'Blenheim.'

To Apple 'Invincible' (votes, unanimous), from Mr. D. Bodaly, Towcester. Very large and heavy; skin green, with a dull red cheek; eye open and very deeply inset. Not very unlike 'Newton Wonder,' but more ridged round the eye and more

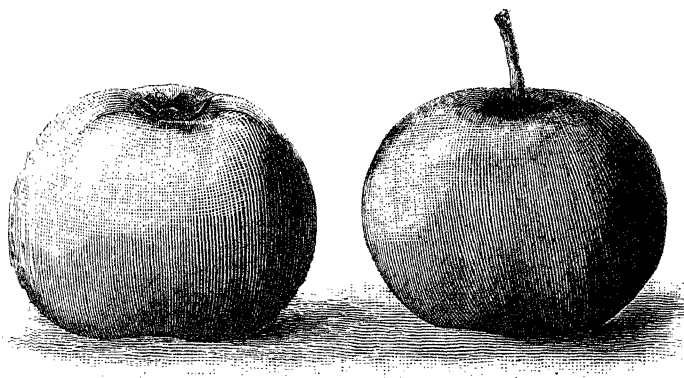


FIG. 123.—APPLE 'MRS. JOHN SEDEN.' (*Journal of Horticulture.*)

Depressed round the stalk, which is very short and deeply inset in an irregular depression. The tree forms a very compact head, and is a prolific bearer. (Fig. 122.)

To Apple 'Mrs. John Seden' (votes, unanimous), from Messrs. J. Veitch, of Chelsea. A cross between 'King of the Pippins' and 'Transcendent Crab.' Small, round, flat, apricot yellow, eye open without any depression, stalk in a depression; a marvellous bearer, the branches shown being literally roped with fruits. Full of juice, crisp but melting, and of excellent flavour. (Fig. 123.)

To Melon 'Wythes Scarlet' (votes, unanimous), from Earl

Percy (gr. Mr. Wythes), Syon House. Fruit small, conical, dark green, densely netted, scarlet flesh.

To Plum 'Primate' (votes, 12 for, 1 against), from Messrs. Rivers, of Sawbridgeworth. Very large indeed, egg-shaped, red covered with a lovely peach bloom. Equally good for cooking or dessert. A very fine addition to our late Plums. (Fig. 124.)

Other Exhibits.

Mr. Martin sent from Stoneleigh Abbey Gardens a new seedling Apple; but it was badly infested with the fungus, which forms little round black spots underneath the skin.

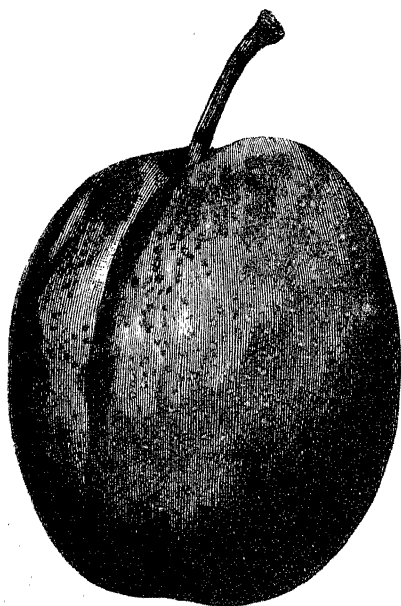


FIG. 124.—PLUM 'PRIMATE.' (*Journal of Horticulture.*)

Mr. J. Williams sent from Whitbourne Hall Gardens a fruit of *Ficus repens* like a small, long, shrivelled Fig.

Mr. R. Veitch, of Exeter, sent Potato 'Walter Raleigh.'

Cecil S. Shepherd, Esq., Trosby, Maidstone, sent a new seedling Peach, 'Princess May.' The fruits were both in appearance and flavour very like 'Alexandra Noblesse,' one of if not the best of all Peaches. The Committee thought very highly of it

indeed, if it continue to ripen so late in the season ; but as this was the first year the plant had borne fruit, they asked to have some sent next year to be sure of its continuing to be a late Peach.

Messrs. McGrady, of Portadown, sent Apple 'Castle Favourite.' They were long past their best.

Mr. J. White sent Tomato 'Walker's Greengage.' A very distinct but hardly desirable variety, resembling a Greengage.

Mrs. Wingfield (gr. Mr. Empson) sent a seedling Apple, 'Bedfordshire Greening.' A bright green Apple with a red cheek, eye closed and in a small and ridged depression, stalk short in a deep depression, with silvery white streaks. A fruit deserving some attention.

Mr. V. Liot, Sydney Park Gardens, sent a seedling Melon.

FRUIT AND VEGETABLE COMMITTEE, OCTOBER 25, 1898.

PHILIP CROWLEY, Esq., in the Chair, and eighteen members present.

Awards Recommended :—

Hogg Memorial Medal.

To Roger Leigh, Esq. (gr. Mr. Woodward), Maidstone, for a collection of wonderful Apples.

Silver Knightian Medal.

To Messrs. Laing, Forest Hill, for Apples.

To Messrs. Cheal, of Crawley, for Apples and Pears.

Silver Banksian Medal.

To C. A. Pearson, Esq. (gr. Mr. Prewett), Frensham Place, for Apples.

To Lord Aldenham (gr. Mr. Beckett), Elstree, for Celery.

Cultural Commendation.

To T. C. Bruce, Esq., New Galloway, N.B., for specimens of very fine Apples grown in Scotland on a north aspect, 500 ft. above the sea, and frost every month of the year.

To Mr. W. Miller, Coombe Abbey, for very fine fruits of *Passiflora edulis*.

To Mr. W. Howe, gardener to Sir Henry Tate, for 'Black Alicante' Grapes.

Other Exhibits.

From the Society's Gardens came specimens of eight varieties of Beet, viz. 'Pragnell's Exhibition,' 'Dell's Crimson,' 'Covent Garden Red,' 'Dewar's Northumberland Short Top,' 'Dropmore Selected,' 'Ashgrove,' 'Red Globe,' **A.M.** 1896, and 'Cheltenham Green Top,' **A.M.** 1896. The two last were still considered the best, although 'Ashgrove' was perhaps the darkest in colour.

Mr. C. Herrin sent from Dropmore Gardens examples of Plums, 'Brahys Late Gage' and 'Coe's Golden Drop.'

Mr. James Vert sent from Saffron Walden Gardens fruits of *Gymnocladus canadensis*, 'The Kentucky Coffee Tree.' They were like rough-skinned Walnuts to look at and to smell, and the juice stained in a similar way; the shell of the nut was also very like that of a Walnut.

Mr. Miller brought from Lord Foley's Gardens several fruits of the old Melon 'William Tillery,' round, green skin well netted, white flesh, very juicy, and sweet-flavoured.

Mr. Taylor, Ash Vale, sent seedling Apples, very like 'Adams' Pearmain.'

Messrs. J. Veitch, of Chelsea, sent Strawberry 'St. Joseph,' bearing a good crop of fruit.

Mr. Crump sent from Madresfield a dish of 'Maltster' Apples of very fine flavour, also a dish of a seedling from it.

Mr. E. Morris, of Barrowmore Hall, sent a seedling Pear, which was considered identical with 'Comte de Lamy.'

Mr. H. Raschin, Forest Hill, sent Apples 'Pigeonnet Rouge' and 'Pigeonnet Blanc.'

From Earl Percy (gr. Mr. Wythes), Syon House, came a fine cluster of Bananas of a variety called 'Syon House Cavendishii.' It was said to be exceedingly dwarf, not exceeding 5 ft. in height, and ripening its fruit in ten months, so as to be available for ordinary fruit houses. The Committee thought very highly of it if it should retain this low-growing habit, but wished to test its continuance for another year. Mr. Wythes also brought a new Tomato of beautiful appearance, 'Duke of York' x 'Conference.' It was desired to try it at Chiswick.

Canon Ellacombe, of Bitton, sent a fruiting spray of *Diospyros Kaki* from a large plant that has been grown for many years in the open air.

FRUIT AND VEGETABLE COMMITTEE, NOVEMBER 8, 1898.

PHILIP CROWLEY, Esq., in the Chair, and fifteen members present.

Awards recommended :—

Gold Medal.

To Messrs. Bunyard, of Maidstone, for 100 dishes of Dessert Apples.

Cultural Commendation.

To Mr. James Vert, gardener to Lord Braybrook at Audley End, for 'Coe's Golden Drop' Plums.

To the grower of fruits of *Cyphomandra betacea* (the Tree Tomato), from the Royal Gardens, Kew. They were from a plant two years old and 10 ft. high, which has borne over two hundred fruits which have ripened in succession during the past six weeks. It requires warm greenhouse treatment, as it comes from Brazil. It is grown in the Mexican House at Kew.

Other Exhibits.

Messrs. Jones, of Shrewsbury, sent a really fine sample of 'Beurré Clairgeau' Pears: "They are a second crop taken from the same tree this year. We gathered a very heavy crop averaging 9 oz. each in the end of September, and the present fruits are from blossoms set in August."

The Earl of Galloway (gr. Mr. Day), Garliestown, N.B., sent beautiful examples of Apple 'James Grieve,' a soft-fleshed, melting, very sweet, and excellent-flavoured Apple raised by Messrs. Dickson, of Edinburgh.

Messrs. Yarde & Co., of Northampton, sent a seedling Apple of very brilliant scarlet colour. Eye open in a slight depression, stalk very short in a deep cavity lined more or less with brown. Not very unlike the old 'Sops in Wine.'

Mr. R. Morse, of Bath, sent specimens, both raw and cooked, of 'Windsor Castle' Potato grown in a garden and also in a

field. In the raw state, to all appearance, there was no difference whatever; but when cooked, whilst those that had been grown in the garden were quite white, those that had been grown in the field were most unsightly, being spotted and blotched all over with black. Some of the soil of the field was sent: it appeared to be very rich, strong soil, containing a good deal of iron. (See p. clxxxi.)

Mr. Bygrave, of Evesham, sent Pea 'Charles I.' to show its

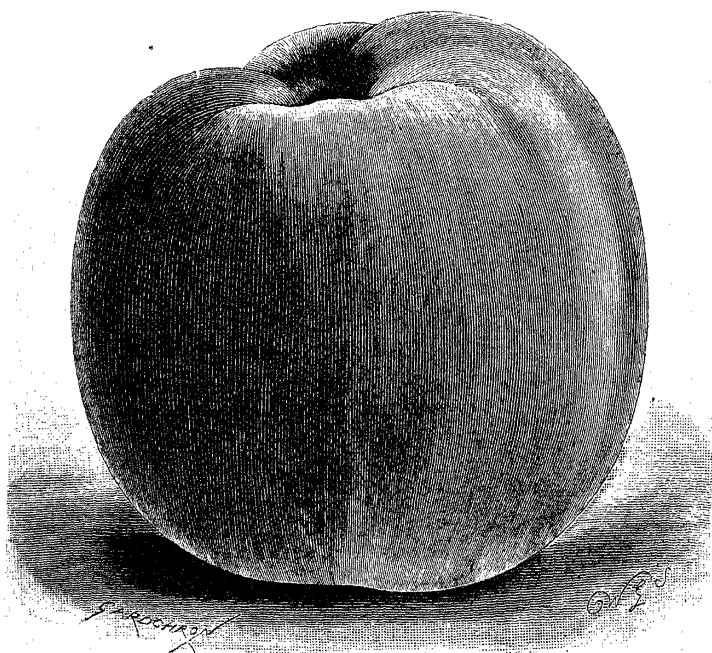


FIG. 125.—APPLE 'BALLINORA PIPPIN.' (*Gardeners' Chronicle*.)

value for late cropping: "The seed was sown on July 8, and dishes have been gathered at frequent intervals from September 1, and plenty more are yet to come if the frost delay." The Committee suggested trying it side by side with 'Ne Plus Ultra' and 'Omega,' which, if as late, are of better quality.

Mr. Vert sent a brace of beautiful Cucumbers, very tender and sweet; but the Committee thought it difficult to distinguish them from a very fine strain of 'Telegraph.'

M. S. Morrison, Esq., Finchley, sent a basket of grandly coloured 'Gascayne's Scarlet' Apples.

The Dowager Lady Bowman sent from Joldwyns fruits of *Akebia quinata*: they were somewhat gourd-shaped and of a lilac-brown colour covered with a dense white bloom. (Fig. 119.)

Messrs. Suttons, of Reading, sent a box of magnificent Cucumbers 'Every Day.'

FRUIT AND VEGETABLE COMMITTEE, NOVEMBER 22, 1898.

PHILIP CROWLEY, Esq., in the Chair, and fifteen members present.

Awards Recommended :—

Award of Merit.

To Apple 'Ballinora Pippin' (votes unanimous), from Messrs. R. Hartland, Lough, Cork. Fruit very large, flattened, round; colour a wonderfully deep blood-crimson; eye very large, open in a deep slightly ridged depression; stalk short in a small deep depression; flesh crisp; flavour good. (Fig. 125.)

Other Exhibits.

Mr. A. Ward, Stoke Edith, sent Apple 'Lady Emily' not very unlike 'Bess Pool.' highly coloured but russety; eye wide open in a large ridged basin; stalk very short in a slight depression.

Sir Joseph Pulley (gr. Mr. Williams), Lower Eaton, sent Apple 'Sir Joseph'; a large yellow fruit streaked with crimson; eye like a 'Blenheim,' but in a deep ridged basin; stalk very short in a very deep depression. The Committee would like to see it again next year.

Mrs. Dunbar, Heath Park, sent Onion 'Ne Plus Ultra.' It was very like 'Ailsa Craig,' but as it was recommended as being such a very long keeping variety, the bulbs were ordered to be kept at Chiswick with some of 'Ailsa Craig,' and both to be brought up in April.

Mr. Tallack, Livermere Park, sent a seedling Apple, small, golden-yellow, streaked with red; eye wide open in a very wide basin; stalk short in a very slight depression. The Committee would like to see it earlier in the season.

Messrs. R. Hartland, Lough, Cork, sent Apple 'Ahern Beauty,' of a most brilliant pink-scarlet colour; large, very conical; eye half closed in a very ridged basin occupying the whole of the summit of the fruit; stalk in a deep depression.

FRUIT AND VEGETABLE COMMITTEE, DECEMBER 13, 1898.

PHILIP CROWLEY, Esq., in the Chair, and twenty members present.

Exhibits :—

Mr. Chas. Seden, Amwell House, sent a seedling Apple 'Arthur Tite' (King of the Pippins ♀ × Kerry Pippin ♂). A small very conical yellow fruit flushed with red; eye closed in a basin occupying the whole of the summit; stalk long in a deepish depression. 'Kerry Pippin' did not appear to have

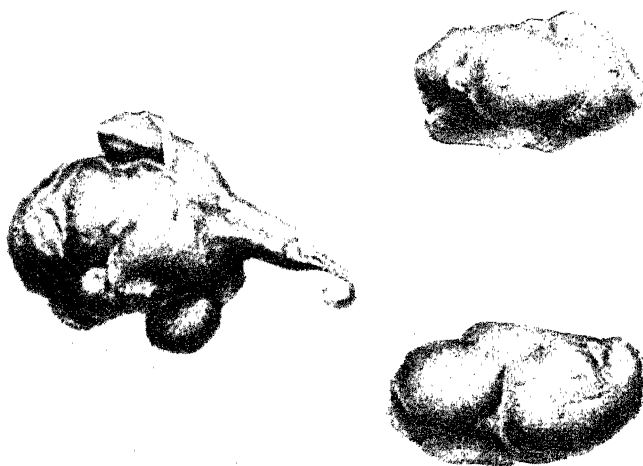


FIG. 126.—TUBERS OF *OXALIS CRENATA*. (*Gardeners' Chronicle*.)

affected the progeny much, but the flavour was distinctly superior to 'King of the Pippins.'

Mr. W. Shingles, Melton Constable, sent a seedling Grape ('Gros Colmar' × 'Lady Hastings'). The cross seemed to have had very little if any effect, the seedling being very little, if at all, superior to Gros Colmar and resembling it very closely.

Mr. Butcher, South Norwood, sent a seedling Apple somewhat resembling 'Baxter's Pearmain.'

Mr. Chas. Ross, Welford Park, sent Apple 'Paroquet.' Fruit very highly coloured all over; angular sided; eye large and open in a very large shallow basin; stalk excessively short in a wide depression; flavour vinous.

Miss Breton, Forest End, sent some very nice Cardoons, showing how well they may be grown.

Mr. Chas. Herrin, Dropmore, sent tubers of *Oxalis crenata*, an edible rooted variety. (Fig. 126.)

FLORAL COMMITTEE.

OCTOBER 11, 1898.

W. MARSHALL, Esq., in the Chair, and twenty-four members present.

Awards Recommended:—

Silver Gilt Flora Medal.

To Earl Percy, Syon House (gr. Mr. Wythes, V.M.H.), for a wonderful display of 30 species and varieties of *Nepenthes*.

To Mr. H. B. May, Edmonton, for a group of *Begonia* 'Gloire de Lorraine,' with *Adiantum Farleyense*.

Silver Flora Medal.

To Messrs. W. Paul, Waltham Cross, for Roses.

To Messrs. Paul & Son, Cheshunt, for Roses.

To Messrs. Veitch, Chelsea, for Perennial Asters (Michaelmas Daisies).

Silver Banksian Medal.

To Messrs. Veitch, Chelsea, for Java *Rhododendrons* and *Physalis Franchetti*.

First-class Certificate.

To *Linospadix Petrickiana* (votes, unanimous), from Messrs. Sander, St. Albans. A sturdy growing Palm with broad, very deeply cut, elegant fronds. In a young state the colour is bronze brown, which changes to a rich shade of green. (Fig. 127.)

To *Alocasia spectabilis* (votes, unanimous), from Messrs. Veitch. This is a new and very beautiful foliage plant from Malaysia. The olive-green shield-shaped leaves have prominent

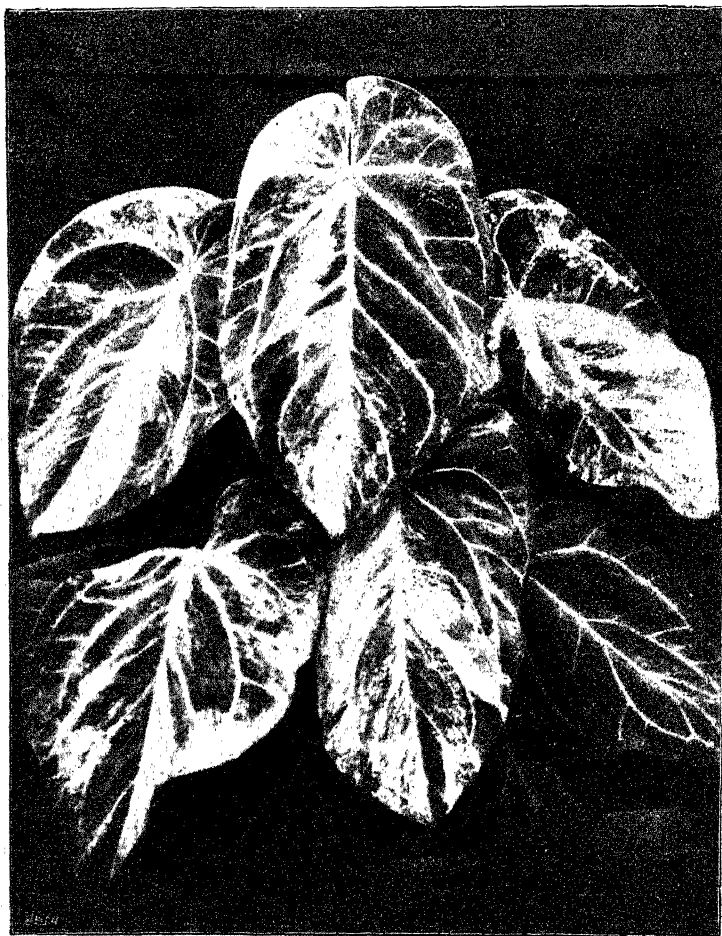


FIG. 128.—*ANTHURIUM CRYSTALLINUM*, VAR. *ILLUSTRE*. (*Gardeners' Chronicle*.)

ribs and silvery venations, and the under surface being brownish-purple gives the plant additional beauty.

Award of Merit.

To decorative *Chrysanthemum* 'Jules Mary' (votes, 13 for)

from Mr. W. Wells, Redhill. Plant of dwarf, bushy habit; very free flowering; flowers brownish crimson.

To Cactus Dahlia 'Ebony' (votes, 10 for, 7 against), from Mr. Mortimer, Farnham. Flowers of medium size, with broad petals; colour deep maroon touched with purple on the outer edge.

To *Dracæna Eeckhautei* (votes, unanimous), from Messrs. Veitch. A free-growing variety with long and rather narrow deep green arching leaves. An improvement on *D. Bruanti*.

Other Exhibits.

Sir Trevor Lawrence, Bart. (gr. Mr. W. Bain), sent *Lobelias*, *Pentstemons*, and *Verbenas*.

F. W. Moore, Esq., Glasnevin, sent beautiful specimens of *Trichinium Manglesii*, which received a F.C.C. in 1865.

Lord Suffield, Gunton Park, Norwich (gr. Mr. W. Allan), sent several spikes of *Kniphofia* (*Tritoma*) *grandis*.

W. Wainwright, Esq., Kimberley, Wymondham, sent an unnamed seedling *Adiantum*.

Owen Owen, Esq., St. John's Wood (gr. Mr. Henry Gritt), brought a promising *Chrysanthemum* named 'Miss Emma Bolton.'

Mr. A. Norton, East Hill, Dartford, sent a sport from *Chrysanthemum* 'Madame Marie Masse' named 'Alfred Norton.'

Messrs. R. Veitch, Exeter, sent flowers of *Hibiscus californicus* grown in the open air.

Mr. R. Gülzow, Bexleyheath, Kent, sent *Anthurium crystallinum illustre*. The Committee asked to see this again with a plant of *A. c. fol. var.* for comparison. (Fig. 128.)

Mr. T. S. Ware, Tottenham, sent a group of hardy flowers.

Mr. G. Prince, Oxford, sent a collection of *Roses*.

FLORAL COMMITTEE, OCTOBER 25, 1898.

W. MARSHALL, Esq., in the Chair, and seventeen members present.

Silver Gilt Flora Medal.

To Messrs. John Waterer, Bagshot, for a collection of choice *Conifers*.

Silver Gilt Banksian Medal.

To Sir Henry Tate (gr. Mr. Howe), Streatham Common, for foliage plants.

To Messrs. J. Hill, Lower Edmonton, for Ferns.

Silver Flora Medal.

To Mr. Mortimer, Farnham, for a collection of Dahlias.

To Mr. W. Wells, Redhill, Surrey, for Chrysanthemums.

To Mr. H. B. May, Upper Edmonton, for foliage and flowering plants.

Silver Banksian Medal.

To C. A. Pearson, Esq. (gr. Mr. Prewett), Frensham Place, Farnham, for Chrysanthemums.

To Mr. T. S. Ware, Tottenham, for Dahlias.

First-class Certificate.

To *Dracæna* 'Victoria' (votes, unanimous), from Mr. Bull, Chelsea. A new species from Brazil. In habit, form, and colour of the leaf it bears some resemblance to *D. Lindenii*.

To *Ptychosperma Sanderiana* (votes, 7 for, 4 against), from Messrs. Sander, St. Albans. A slender-growing Palm with elegant arching fronds. The narrow pinnæ are long and of a pleasing shade of green. (Fig. 129.)

Award of Merit.

To Japanese *Chrysanthemum* 'Soleil d'Octobre' (votes, unanimous), from Leopold de Rothschild, Esq. (gr. Mr. Hudson), Gunnersbury House, Acton, and Mr. H. J. Jones, Lewisham. Flowers large, well formed, canary yellow shading to deeper yellow with age.

To Incurved *Chrysanthemum* 'Baron Veillard' (votes, unanimous), from Mr. Godfrey, Exmouth, and Mr. Owen, Maidenhead. Well formed, orange-red flowers suffused with buff.

To Incurved *Chrysanthemum* 'Major Mathew' (votes, unanimous), from Mr. Godfrey. Flowers pinkish purple, of fine form and substance.

To Decorative *Chrysanthemum* 'Ettie Mitchell' (votes, unanimous), from Mr. Godfrey. Plant of bushy, spreading habit; very free flowering; yellow touched with bronze.

To Tea Rose 'Sunrise' (votes, unanimous), from Mr. G. W. Piper, Uckfield. A lovely and deliciously scented free-flowering button-hole Rose. The colour is yellow shaded with salmon, the exterior of the petals being stained with reddish orange.

To Decorative Chrysanthemum 'Nellie Brown' (votes,



FIG. 129.—PTYCHOSPERMA SANDIERIANA. (*Gardeners' Chronicle*.)

unanimous), from Messrs. H. Cannell, Swanley, and Mr. Wells, Redhill. A very free-flowering variety, a sport from 'Ryecroft Glory,' with bronzy orange flowers tipped with yellow.

To Decorative Chrysanthemum 'Golden Queen of the Earlies' (votes, unanimous), from Mr. H. J. Jones. Another free-flowering variety, with medium-sized primrose-yellow flowers.

Botanical Certificate.

To *Ceropegia Woodi* (votes, unanimous). A curious small-leaved plant from Natal, suitable for hanging baskets. The heart-shaped leaves are beautifully variegated with silvery grey.

Other Exhibits.

H. J. Elwes, Esq., V.M.H., Colesborne, Andoversford (gr. Mr. Lane), sent four seedling Nerines.

H. P. Leschallas, Esq., Highams, Windlesham, sent *Chrysanthemum* 'Miss Mary Leschallas.'

A. Kingsmill, Esq., Harrow Weald, sent long sprays of *Vitis heterophylla humulifolia*, carrying an abundance of pretty sky-blue Grapes.

From Mr. Godfrey, Exmouth, came many new varieties of *Chrysanthemums*.

Mr. R. Gülzow, Bexleyheath, sent a large plant of *Anthurium crystallinum illustre*, which received a first-class certificate in 1893 as *A. c. fol. var.*

Mr. R. Owen, Maidenhead, sent *Chrysanthemums*.

Messrs. W. Cutbush, Highgate, brought a group of flowering plants.

Mr. Spink, Walthamstow, sent *Chrysanthemums*.

Mr. J. R. Box, Croydon, sent a small collection of tuberous *Begonias*.

From Messrs. Cannell, Swanley, came a small group of *Chrysanthemums* and *Polygonums*.

FLORAL COMMITTEE, NOVEMBER 8, 1898.

W. MARSHALL, Esq., in the Chair, and sixteen members present.

Awards Recommended :—*Silver Gilt Flora Medal.*

To Mr. H. B. May, Edmonton, for fifty species and varieties of *Polypodiums*.

Silver Gilt Banksian Medal.

To H. J. Elwes, Esq., V.M.H., Colesborne, Andoversford (gr.

Mr. Lane, for a most beautiful collection of hybrid and seedling Nerines.

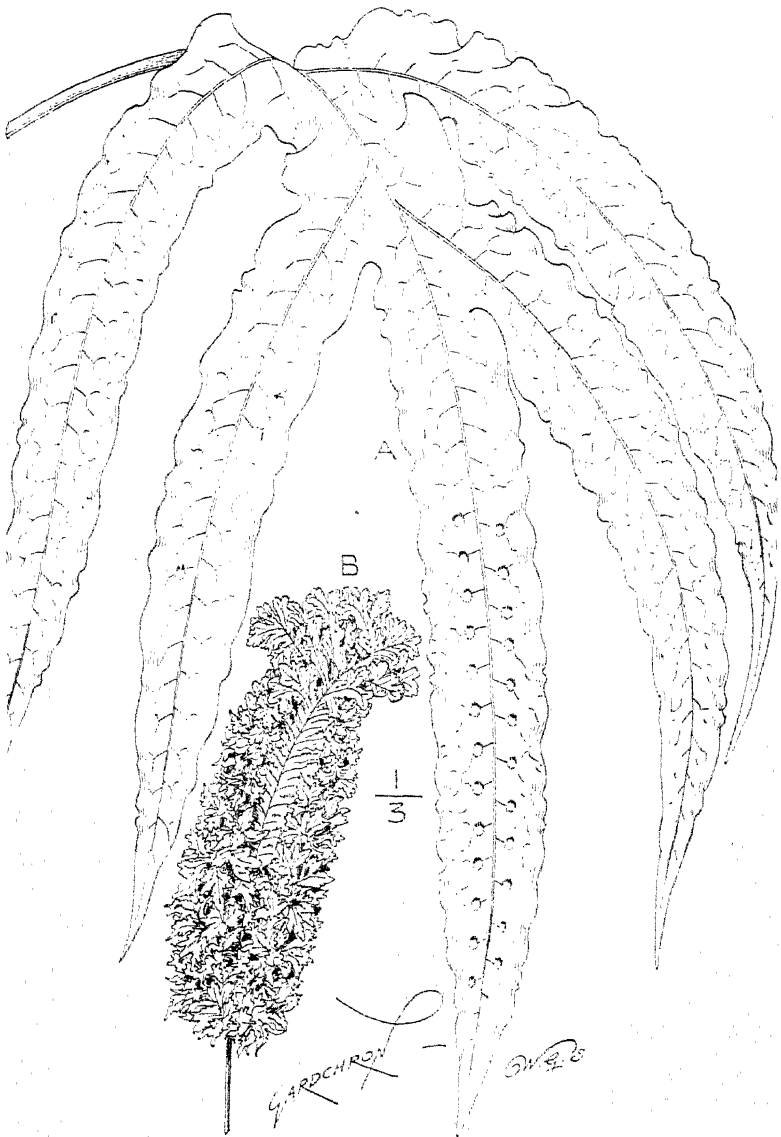


FIG. 130.—A. *POLYPODIUM NIGRESCENS* ; B. *P. VULGARE GRANDICEPS*. (*Gardeners' Chronicle*.)

Silver Flora Medal.

To Mr. W. Wells, Redhill, for Chrysanthemums.

To Mr. T. S. Ware, Tottenham, for Chrysanthemums and Dahlias.

First-class Certificate.

To *Polypodium grandi-nigrescens* (*P. nigrescens* × *P. vulgare grandiceps*) (votes, 13 for), from Messrs. J. Veitch, Chelsea. This is a vigorous-growing variety, with dense tufts of tassels at the tips of the large deep green fronds. Whether this should be regarded as a true hybrid or as a seminal variety of *nigrescens* is a little doubtful. Cf. p. 455. (Figs. 130 and 131.)

Award of Merit.

To Japanese Chrysanthemum 'Jane Molyneux' (votes, unanimous), from J. C. Garnier, Esq., Rooksbury Park, Fareham (gr. Mr. N. Molyneux). A magnificent variety with large, drooping, pure-white petals.

To Nerine 'Lady Clementina Mitford' (votes, unanimous), from H. J. Elwes, Esq., V.M.H. Flowers borne in compact trusses, pale pink stained with a deeper shade towards the centre. The petals are beautifully undulated towards the tips.

To Nerine 'Mrs. Douglas' (votes, 7 for, 5 against), from H. J. Elwes, Esq. The bell-shaped flowers are large and borne in handsome trusses, pale pink suffused with rose and striped with red down the centre of each segment.

To Nerine 'Miss Jekyll' (votes, unanimous), from H. J. Elwes, Esq. Very large trusses of rosy salmon flowers with beautifully undulated petals.

To Japanese Chrysanthemum 'John Pockett' (votes, 11 for, 4 against), from Mr. Wells, Redhill. Deep crimson flowers with a yellow reverse.

To Japanese Chrysanthemum 'Nellie Pockett' (votes, 13 for, 2 against), from Mr. Wells. Flowers of good form and substance, white shaded with pale yellow.

To Incurved Chrysanthemum 'President Bevan' (votes, 10 for, 2 against), from Mr. Wells and Mr. W. J. Godfrey, Exmouth. A remarkably fine variety with large flowers, sulphur yellow suffused with pink.

To Begonia 'Winter-Perfection' (*B. socotrana* × *B. tuberosa*)

variety) (votes, 9 for, 3 against), from Messrs. Veitch. A free-flowering variety, with semi-double salmon-pink flowers touched with rose. The flowers are large, and borne on stout stalks well above the foliage.

To *Dracæna* 'The Sirdar' (votes, 12 for), from Messrs. Veitch.



FIG. 131.—*POLYPODIUM GRANDI-NIGRESCENS*. (*Gardeners' Chronicle*.)

A graceful variety, with broad drooping leaves of metallic green, irregularly margined with rose-pink.

To Japanese Chrysanthemum 'Mrs. W. Mease' (votes, unanimous), from Mr. R. Owen, Maidenhead. Flowers very large, with long, narrow, drooping, pale sulphur-yellow petals.

To Japanese Chrysanthemum 'Lord Cromer' (votes, unanimous), from Mr. Owen. An exceedingly handsome variety, with large, deep crimson flowers, with a yellow reverse.

Other Exhibits.

Miss E. Beveridge, Rose Bank, Caterham, sent a seedling Chrysanthemum named 'Gem of Tokio.'

R. C. Christie, Esq., Ribsden, Windlesham (gr. Mr. Wilson), sent *Dracæna* 'Mrs. Christie.'

W. H. Evans, Esq., Forde Abbey (gr. Mr. Crook), brought sweet-scented double Violets.

Mr. W. J. Godfrey, Exmouth, sent several Chrysanthemums.

Messrs. Bunyard, Maidstone, sent a zonal *Pelargonium* 'White Abbey,' synonymous with 'La Favorite.'

Mr. H. Elliott, Lancing, sent a new *Nerine* named 'The Sirdar.'

From Mr. R. Gülzow, Bexleyheath, came two *Dracænas*.

Messrs. J. Veitch, Chelsea, sent two large flowering plants of *Aster Tradescanti* and *A. Drummondii* 'Sappho.'

Messrs. W. Ray, Teynham, sent a sport from Chrysanthemum 'Mlle. M. A. de Galbert' named 'Archie Ray.'

Messrs. Sander, St. Albans, sent *Kentia Kirsteniana*.

FLORAL COMMITTEE, NOVEMBER 22, 1898.

W. MARSHALL, Esq., in the Chair, and fifteen members present.

Awards Recommended :—

Gold Medal.

To Mr. Norman Davis, Framfield, Sussex, for an artistic arrangement of magnificent Chrysanthemums and autumn foliage.

Silver-gilt Banksian Medal.

To Mr. H. B. May, Edmonton for *Dracænas*, Ferns, and *Bouvardias*.

Silver Flora Medal.

To Messrs. Cripps, Tunbridge Wells, for a group of very fine Euphorbia (Poinsettia) pulcherrima.

To Messrs. Cannell, Swanley, for Chrysanthemums.

Silver Banksian Medal.

To the Dowager Lady Freake, Fulwell Park, Twickenham (gr. Mr. Rickwood), for Chrysanthemums.

To T. B. Haywood, Esq., Woodhatch, Reigate (gr. Mr. Salter), for Chrysanthemums.

To F. W. Flight, Esq., Twyford, Cornstiles, for Chrysanthemums.

To Mr. W. Wells, Earlswood, for Chrysanthemums.

First-class Certificate.

To Epiphyllum truncatum 'Princess' (votes, unanimous), from Mr. Bull, Chelsea. A distinct and handsome variety with pale flesh-coloured flowers.

Award of Merit.

To Japanese Chrysanthemum 'Mrs. Barkley' (votes, unanimous), from Lady Byron, Thrumpton Hall, Derby (gr. Mr. H. Weeks). An exceptionally large flower, with broad reflexed petals of rosy mauve running into a lighter shade.

To Decorative Chrysanthemum 'Golden Shower' (votes, 11 for, 2 against), from Mr. Witty, Nunhead Cemetery. The flowers with long, narrow, drooping petals are golden yellow, shaded with bronze. The plant is of tall habit, and not very free flowering. (Fig. 132.)

To Japanese Chrysanthemum 'Chatsworth' (votes, 8 for, 3 against), from Mr. Godfrey, Exmouth, Messrs. Cannell, and Mr. W. Wells. Large and finely formed flowers of rosy purple, with a paler reverse.

To Decorative Chrysanthemum 'Beauty of Sholing' (votes, unanimous), from Mr. W. Wells. A free-flowering variety, with bronzy-yellow flowers tipped with yellow.

To Single Chrysanthemum 'Earlswood Beauty' (votes, unanimous), from Mr. Wells. The creamy-white flowers are of medium size and borne very freely.

To Single Chrysanthemum 'Daisy Brett' (votes, unanimous),

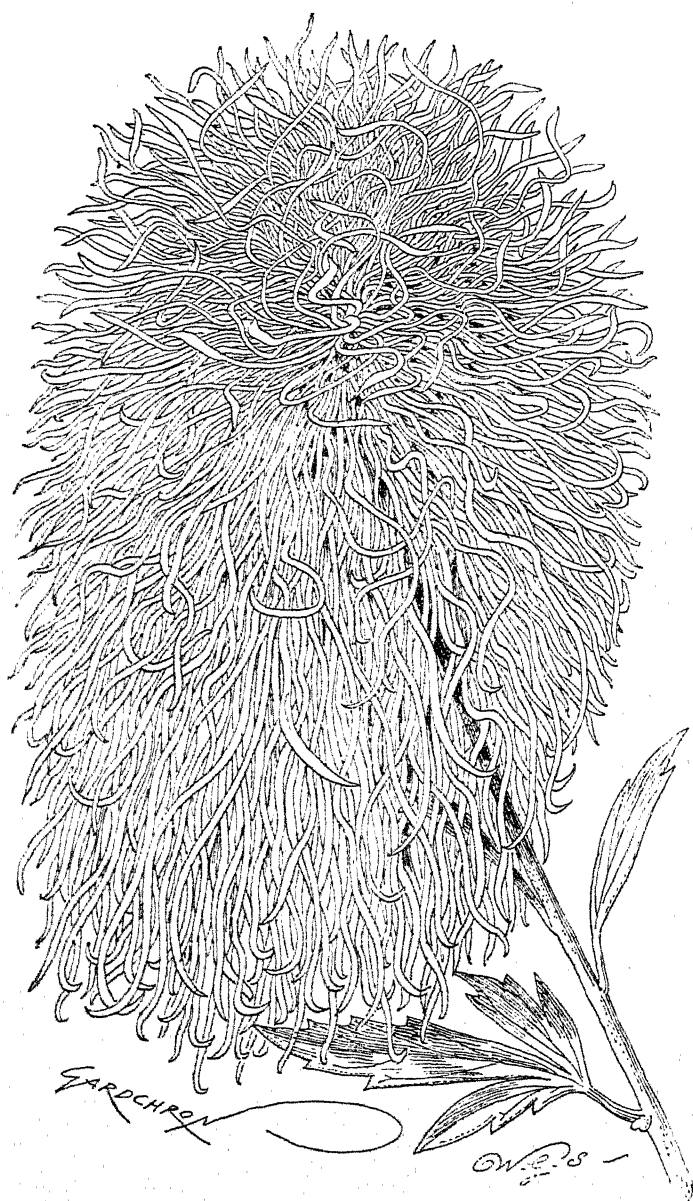


FIG. 132.—CHRYSANTHEMUM 'GOLDEN SHOWER.' (*Gardeners' Chronicle*.)

from Mr. Wells. This is a sport from 'Earlswood Beauty,' with large pure-white flowers.

Other Exhibits.

Sir Trevor Lawrence, Bart., Dorking (gr. Mr. W. Bain), sent *Ornithogalum lacteum*.

Gilbert Christy, Esq., Lime Street, brought a new species of *Begonia*. See page clxxxv.

Messrs. J. Veitch, Chelsea, sent a group of winter-flowering *Begonias*.

Chrysanthemums were exhibited by—

1. Lady Byron, Thrumpton Hall, Derby (gr. Mr. Weeks).
2. Mrs. Crawford, Gatton Cottage (gr. Mr. Slogrove).
3. J. C. Garnier, Esq., Rookesbury Park (gr. Mr. N. Molyneux).
4. Miss Beveridge, Rose Bank, Caterham Valley.
5. Mr. W. J. Godfrey, Rolle Street, Exmouth.
6. Mr. W. Hattin, Junction Road, Croydon.
7. Mr. R. Holmes, King Street, Norwich.

FLORAL COMMITTEE, DECEMBER 13, 1896.

W. MARSHALL, Esq., in the Chair, and twenty-one members present.

Awards Recommended :—

Silver Gilt Banksian Medal.

To Mr. H. B. May, Edmonton, for a group of *Begonia* 'Gloire de Lorraine.'

To Messrs. Cannell, Swanley, for a beautiful selection of new zonal *Pelargoniums*.

Silver Flora Medal.

To Messrs. Veitch, Chelsea, for winter-flowering *Begonias*.

Silver Banksian Medal.

To C. A. Pearson, Esq, Frensham Place, Farnham (gr. W. J. Prewett), for flowering and foliage plants.

To Mr. Wells, Earlswood, Redhill, for *Chrysanthemums*.

To Messrs. Sander, St. Albans, for flowering and foliage plants.

First-class Certificate.

To *Asparagus Sprengeri compacta* (votes, 12 for, 6 against), from Mr. May, Edmonton. This is a seedling, and differs from

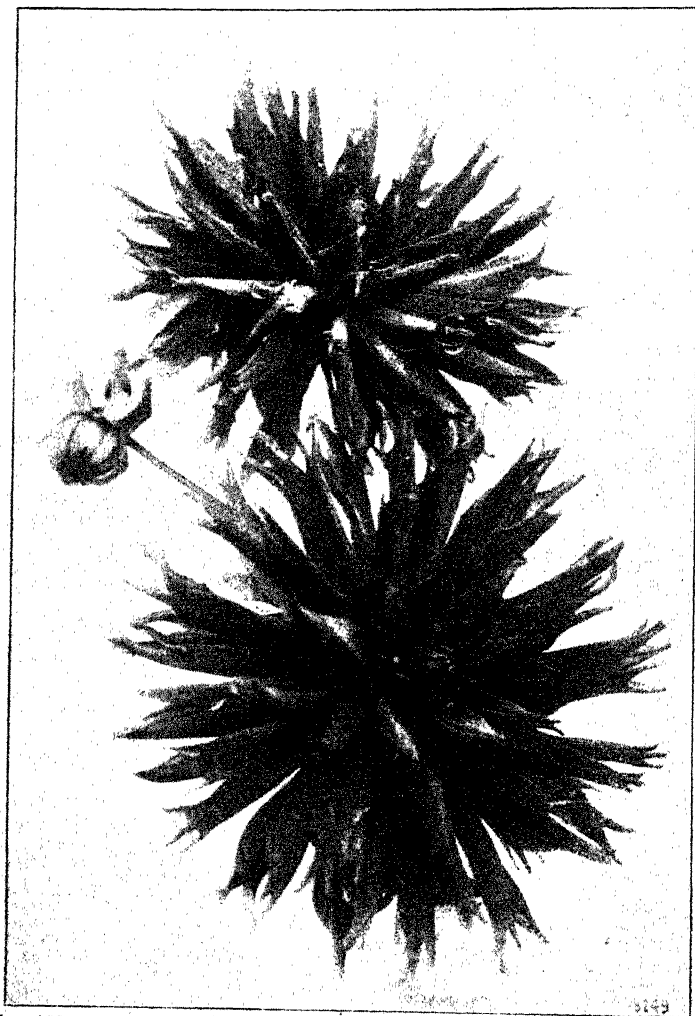


FIG. 133.—CACTUS DAHLIA 'PROGENITOR'; see page clvii. (*Gardeners' Magazine*.)

the type in its more compact habit, shorter growths, and deeper glossy green leaves. A remarkably pretty basket plant.

Other Exhibits.

A. Kingsmill, Esq., Harrow Weald, Stanmore, sent flowers of *Aristolochia gigas ornithocephala*, and *Narcissus viridiflorus*.

Mrs. Wingfield, Amptill House (gr. Mr. Empson), sent a plant of *Plumbago rosea*, an old and well-known species.

Mr. Watts, Avery Hill, Eltham, brought a patent flower clip.

Mr. Wells, Redhill, brought *Chrysanthemums* 'Sunset' and 'Snowflake.' The Committee asked to see a plant of each.

Mr. Eckford Wem sent Chinese *Primulas*.

Messrs. Veitch, Chelsea, sent a yellow-flowered *Rhododendron* named 'Exquisite' (*R. Javanicum* × *Teysmannii*). The Committee expressed a wish to see this again.

Mr. Godfrey, Exmouth, sent three varieties of *Chrysanthemums*. The Committee asked to see a plant of the one named 'Queen of Pink.'

ORCHID COMMITTEE.

OCTOBER 11, 1898.

HARRY J. VEITCH, Esq., in the Chair, and sixteen members present.

Awards Recommended:—

Silver Gilt Flora Medal.

To Messrs. de Rothschild, Gunnersbury House, Acton (gr. Mr. Jas. Hudson), for a splendid group of *Dendrobium formosum giganteum*, consisting of thirty-four plants, bearing together nearly seven hundred flowers. Mr. Hudson also staged good examples of *Odontoglossum grande* and *Vanda Kimballiana*.

Silver Banksian Medal.

To Messrs. Paul & Son, Cheshunt, for a group of *Masdevallia Tovarensis*, grown during the summer in a cold frame shaded by a wood-lath blind.

Bronze Banksian Medal.

To Messrs. Hugh Low, Bush Hill Park, Enfield, for a group of Orchids.



FIG. 134.—LÆLIO-CATTELEYA × DOMINIANA VAR. LANGLEYENSIS. (*Journal of Horticulture*.)

First-class Certificate.

To Lælio-Cattleya \times Dominiana var. Langleyensis (C. Dowiana \times L. purpurata) (votes, unanimous), from Messrs. James Veitch, Chelsea. The original plant flowered in 1878, and this is the second production. Sepals and petals pink, veined with purple; labellum rich maroon purple with narrow lavender margin and yellow base. (Fig. 134.)

Award of Merit.

To Sophro-Cattleya \times 'Cleopatra' (Sophronitis grandiflora \times Cattleya Leopoldii) (votes, 7 for, 5 against), from Messrs. Charlesworth, Heaton, Bradford. A three-flowered inflorescence was sent, without the plant. Flowers two inches across; of a peculiar yellowish brick-red colour; lip yellow at the base, with purplish lines.

To Lælio-Cattleya \times 'Henry Greenwood' (L.-C. \times Schilleriana \times C. \times Hardyana) (votes, unanimous), from Messrs. Williams, Holloway. A fine hybrid, with the habit of Lælio-Cattleya \times Schilleriana, but with lip more ample. Sepals greenish white suffused with rose; petals light lilac with darker veining. Lip white at the base, veined with rose, middle portion chrome yellow, front lobe and tips of the recurved side lobes velvety-purple. (Fig. 136.)

To Dendrobium \times Rhodostoma (Huttonii \times sanguinolentum) (votes, unanimous), from Messrs. Jas. Veitch. An almost perpetual-flowering variety raised some years ago, and having short fascicles of cream-coloured flowers tipped with claret colour.

Botanical Certificate.

To Angræcum ichneumoneum, from J. Millar Mundy, Esq., Shipley Hall, Derby (gr. Mr. Elphinstone). A dwarf species of the habit of A. pellucidum and bearing racemes of small yellowish flowers.

To Epidendrum porphyreum, from Sir Trevor Lawrence, Bart. (gr. Mr. W. H. White). This is the first time this species has been exhibited. Stems tall, clad with green, purple-tinted leaves, and bearing at the apex drooping heads of orange-coloured flowers with white to yellow labellums according to maturity.

To *Maxillaria longissima*, from F. W. Moore, Esq., Royal Botanic Gardens, Glasnevin. A curious species of the *M. lepidota* class, with long, spreading, narrow, yellowish segments.

Cultural Commendation.

To Mr. J. Howes, gr. to Walter Cobb, Esq., Tunbridge Wells, for a splendid plan of *Vanda Sanderiana*.

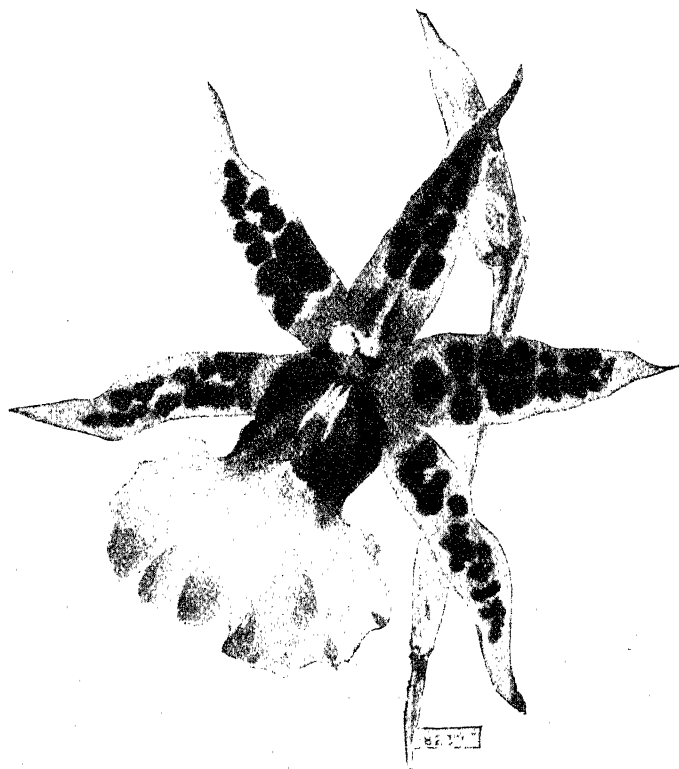


FIG. 135.—*MILTONIA BLUNTHII* VAR. *LUBBERSIANUM*. (*Gardeners' Chronicle*.)

To Mr. Elphinstone, gr. to E. Millar Mundy, Esq., for a fine specimen of *Angræcum ichneumoneum*.

To B. B. Baker, Esq., for a fine specimen of *Odontoglossum grande*.

To Mr. Whitlock, gr. to W. A. Bilney, Esq., Weybridge, for *Lælia pumila*.



FIG. 136. -LÆLIO-CATTLEYA 'HENRY GREENWOOD.' (*Gardeners' Chronicle.*)

Other Exhibits.

Sir Trevor Lawrence, Bart. (gr. Mr. W. H. White), showed an interesting collection, including fine hybrid Cattleyas, *Miltonia* × *Lamarcheana*, *Cattleya* × 'St. Benoit' (? *Schröderæ* × *Acklandiæ*); *Lælio* - *Cattleya* × *Exoniensis*; *Cypripedium* × 'Lawrebel,' and *Miltonia* *Bluntii* var. *Lubbersianum*. (Fig. 135.)

Messrs. F. Sander & Co. showed various rare Orchids.

R. Brooman-White, Esq., Arddarroch, N.B., sent a small hybrid *Cypripedium* of the C. × 'Chas. Rickman' class.

Messrs. B. S. Williams & Son, Holloway, showed *Cypripedium* *Charlesworthii* *magnificum*.

ORCHID COMMITTEE, OCTOBER 25, 1898.

HARRY J. VEITCH, Esq., in the Chair, and fifteen members present.

Awards Recommended :—

Silver Flora Medal.

To Messrs. Jas. Veitch, Chelsea, for a fine group of Orchids.

Silver Banksian Medal.

To Sir Frederick Wigan, Bart., Clare Lawn, East Sheen (gr. Mr. W. H. Young), for a group of Orchids.

To Messrs. Stanley Mobbs & Ashton, Southgate, for a group of Orchids.

First-class Certificate.

To *Cattleya* × *Maronii* (*velutina* ♀ *Dowiana aurea* ♂) (votes, 9 for, 1 against), from M. Chas. Maron, Rue de Montgeron, Brunoy (Seine-et-Oise), France. A very distinct hybrid with bronzy yellow flowers, the labellum veined with crimson. The plant shown had a seven-flowered inflorescence. (Figs. 137 and 138.)

Award of Merit.

To *Lælia pumila* *Colmanii* (votes, unanimous), from Jeremiah Colman, Esq., Gatton Park (gr. Mr. W. King). Flowers large, blush-white, with purple and rose markings on the lip.

To *Laelia Perrinii leucophæa* (votes, unanimous), from Sir Frederick Wigan, Bart. (gr. Mr. W. H. Young). Flowers white tinged with lavender, the front of the lip slate-blue. (Fig. 139.)



FIG. 137.—*CATTELEYA* × *MARONII*. (*Gardeners' Chronicle*.)

Botanical Certificate.

To *Angræcum Germinyanum*, from F. W. Moore, Esq., Royal Botanic Gardens, Glasnevin. Flowers with long, yellowish, narrow segments; lip funnel-shaped, white.

Other Exhibits.

Henry Greenwood, Esq., Highfield, Haslingden (gr. Mr. Gill), showed the original *Lælio-Cattleya* × 'Henry Greenwood' (*C.* × *Hardyana* × *L.-C.* × *Schilleriana*), which was awarded a silver-gilt medal at the Ghent Show.

J. Gurney Fowler, Esq., Glebelands, South Woodford (gr. Mr. J. Davis), sent a yellow form of *Cypripedium insigne*.

W. A. Gillett, Esq., Fair Oak Lodge, Bishopstoke (gr. Mr.



FIG. 138.—*CATTLEYA VELUTINA*, FEMALE PARENT OF *CATTLEYA* × *MARONII*.
(*Gardeners' Chronicle*.)

Carr), sent varieties of *Cattleya labiata*, *C. Warscewiczii* and *Dendrobium Phalænopsis*.

Mr. Jas. Douglas, Great Bookham, showed *Lælia* × 'Briseis' (*harpophylla* ♀ *purpurata* ♂), and a reproduction of the old *Cypripedium* × *macropterum* (*Lowii* ♀ *superbiens* ♂).

Mr. Walter Goodliffe, Cambridge Nurseries, Worthing, showed hybrid *Cypripediums* between *Io grande* and *Boxalli*.



FIG. 139.—*LÆLIA PERRINII LEUCOPHÆA*. (*Journal of Horticulture*.)

Mrs. Clorinda Roberts, Rose Hill House, Ipswich, showed *Cattleya labiata* and *C. elongata*, grown on "Clozone" pots.

Messrs. F. Sander & Co. showed a collection of Orchids.

Walter Cobb, Esq., Dulcote, Tunbridge Wells (gr. Mr. J. Howes), showed a yellow form of *Cypripedium insigne*.

ORCHID COMMITTEE, NOVEMBER 8, 1898.

HARRY J. VEITCH, Esq., in the Chair, and eleven members present.

Awards Recommended:—

Gold Medal.

To Messrs. Jas. Veitch, Chelsea, for a very fine group of Orchids, principally hybrids, among which were many examples of their autumn-flowering hybrids obtained out of *Lælia Perrinii* and *Cattleya Bowringiana*.

Silver Banksian Medal.

To the Right Honble. Joseph Chamberlain, M.P., Highbury (gr. Mr. Smith), for a group of hybrid Orchids.

To H. F. Simonds, Esq., Beckenham (gr. Mr. G. E. Day), for a group of Orchids.

To J. Bradshaw, Esq., The Grange, Southgate (gr. Mr. Whiffen), for a group of *Cattleya labiata*, in which were two white forms.

Bronze Banksian Medal.

To Mr. Jas. Douglas, Great Bookham, for a collection of spikes of *Cattleya labiata*.

Award of Merit.

To *Cattleya Bowringiana* 'Lady Wigan' (votes, unanimous), from Sir Frederick Wigan, Bart. (gr. Mr. W. H. Young). A very remarkable colour variation, the prevailing tint of the flowers being light purplish lilac. (Fig. 140.)

To *Cypripedium* × *Wottonii* (*bellatulum* × *callosum*) (votes, unanimous), from R. I. Measures, Esq., Cambridge Lodge, Camberwell (gr. Mr. H. J. Chapman). A fine hybrid with flowers shaded and streaked with dark rose colour.

Botanical Certificate.

To *Dendrobium chloropterum*, from Messrs. F. Sander, St. Albans. Plant resembling *D. atro-violaceum*; flowers emerald-green with maroon markings on the lip.

Other Exhibits.

The Right Honble. Lord Lisburn, Aberystwith (gr. Mr. Williams), showed *Cattleya labiata* Lisburniana. Fine in colour.

Captain Holford, Westonbirt (gr. Mr. Chapman), showed

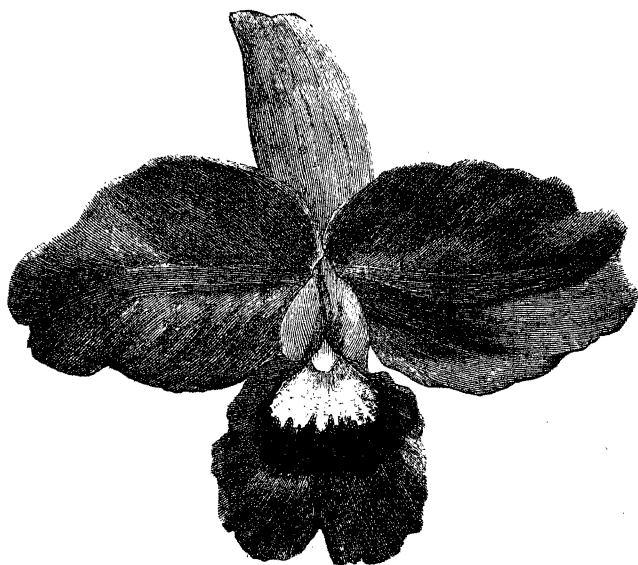


FIG. 140.—*CATTELEYA BOWRINGIANA* 'LADY WIGAN.' (*Journal of Horticulture*.)

Cypripedium × *Statterianum* 'Holford's variety' (*Spicerianum* magnificum ♀ *vexillarium* ♂).

J. T. Bennett-Poë, Esq. (gr. Mr. Downes), showed true *Vanda insignis*.

Sir Wm. Marriott, Bart., Blandford (gr. Mr. Denny), again showed his *Sophrolaelia* × *Marriottii* (*L. flava* ♂ *S. grandiflora* ♀).

Messrs. Sander, St. Albans, showed *Cypripedium* × *Jensenianum* (*hirsutissimum* × *vexillarium*) and other Orchids.

ORCHID COMMITTEE, NOVEMBER 22.

SYDNEY COURTAULD, Esq., in the Chair, and fourteen members present.

Awards Recommended :—*Silver Banksian Medal.*

To J. Bradshaw, Esq., The Grange, Southgate (gr. Mr. Whiffen), for a group of Orchids in flower, including a fine form of *Cymbidium Tracyanum*.

Bronze Banksian Medal.

To H. T. Simonds, Esq., Woodthorpe, Beckenham (gr. Mr. G. Day), for a group of Orchids.

Award of Merit.

To *Dendrobium* × *formoso-Lowi* (*formosum* ♀ *Lowi* ♂) (votes, unanimous), from Sir Trevor Lawrence, Bart., Burford (gr. Mr. W. H. White). An interesting hybrid distinctly intermediate in size and form between the species used in its production. Flowers silvery white, with raised hairy orange-brown lines on the lip.

To *Calanthe* × *labrosior* (votes, unanimous), from Sir Trevor Lawrence, Bart. (gr. Mr. W. H. White). A fine, large cream-white hybrid with blush tint on the lip. Parentage unrecorded.

To *Cypripedium* × *Argo-Morganiae* (*Argus* ♀ *Morganiae* ♂) (votes, 9 for, 4 against), from Sir Trevor Lawrence, Bart. Upper sepal white, with very narrow green and rose lines. Petals curved downwards, broad, pinkish-white, with large chocolate-coloured blotches. Lip dark brownish rose. (Fig. 141.)

Botanical Certificate.

To *Cirrhopetalum appendiculatum*, new species, from Sir Trevor Lawrence, Bart. The first of the species with only one flower on a scape to be shown. Flower eight inches in length. Upper sepals and petals white, with purple lines, and bearing at the extremity elegant purple plumes. Lower sepals closely approaching each other, and tapering to a fine point. (Fig. 142.)

Cultural Commendation.

To Mr. W. H. White, gr. to Sir Trevor Lawrence, Bart., for

a grandly flowered plant of *Calanthe* × 'Bryan,' with pseudo-bulb eight inches in circumference.

To Mr. Whiffen, gr. to J. Bradshaw, Esq., for *Cymbidium* ×

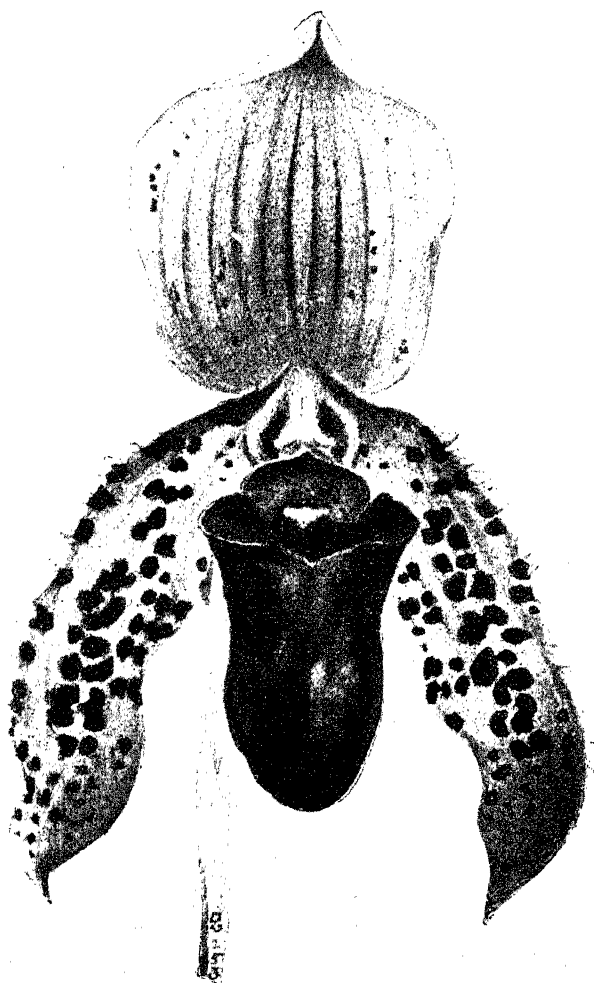


FIG. 141.—*CYPRIPEDIUM* × *AGRO-MORGANIAE*. (*Gardeners' Magazine*.)

Winnianum (*giganteum* ♀ *eburneum* ♂), with nine fine flower spikes.

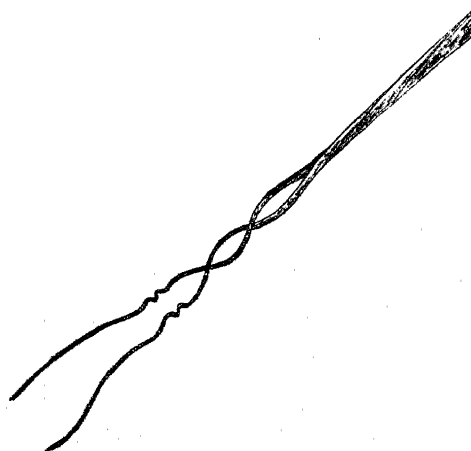


FIG. 142.-



-CIRRHOPETALUM APPENDICULATUM. (*Gardeners' Chronicle*.)

Other Exhibits.

Messrs. Jas. Veitch, Chelsea, showed *Oncidium pectorale*.

Sir Wm. Marriott (gr. Mr. Denny) showed *Lælio-Cattleya* × 'Clonia' (*C. Warscewiczii* × *L.-C.* × *elegans*).

F. W. Moore, Esq., Royal Botanic Gardens, Glasnevin, Dublin, sent *Masdevallia Veitchiana* 'Prince des Galles' and *Mormodes Lawrenceana*.

J. T. Bennett-Poë, Esq. (gr. Mr. Downes), showed a six-branded spike of *Oncidium tigrinum* and *Aërides Lawrencei*.

J. Lister Godlee, Esq., Walthamstow (gr. Mr. J. Medcalf), showed *Cypripedium* × 'T. B. Haywood.'

ORCHID COMMITTEE, DECEMBER 13, 1898.

HARRY J. VEITCH, Esq., in the Chair, and fourteen members present.

Awards Recommended:—

Silver Flora Medal.

To Sir Trevor Lawrence, Bart., Burford (gr. Mr. W. H. White), for a fine group of hybrid *Calanthes* and other Orchids.

To R. I. Measures, Esq., Cambridge Lodge, Camberwell (gr. Mr. H. J. Chapman), for a group of hybrid *Cypripediums*.

Silver Banksian Medal.

To Messrs. Jas. Veitch, Chelsea, for a group of Orchids, rich in hybrid *Cattleyas* and *Lælias*.

To Captain Holford, Westonbirt, Tetbury (gr. Mr. A. Chapman), for a group of cut flowers of over forty varieties of *Cypripediums*.

To Messrs. Hugh Low, Enfield, for a group of Orchids.

Bronze Banksian Medal.

To Henry Little, Esq., Baron's Halt, Twickenham (gr. Mr. Howard), for a group of Orchids.

First-class Certificate.

To *Cypripedium insigne* 'Harefield Hall variety' (votes, unanimous), from Elijah Ashworth, Esq., Harefield Hall,

Wilmslow (gr. Mr. Holbrook). The largest form of the species which has yet appeared. (Fig. 143.)

Award of Merit.

To *Calanthe* × *revertens* (votes, unanimous), from Sir

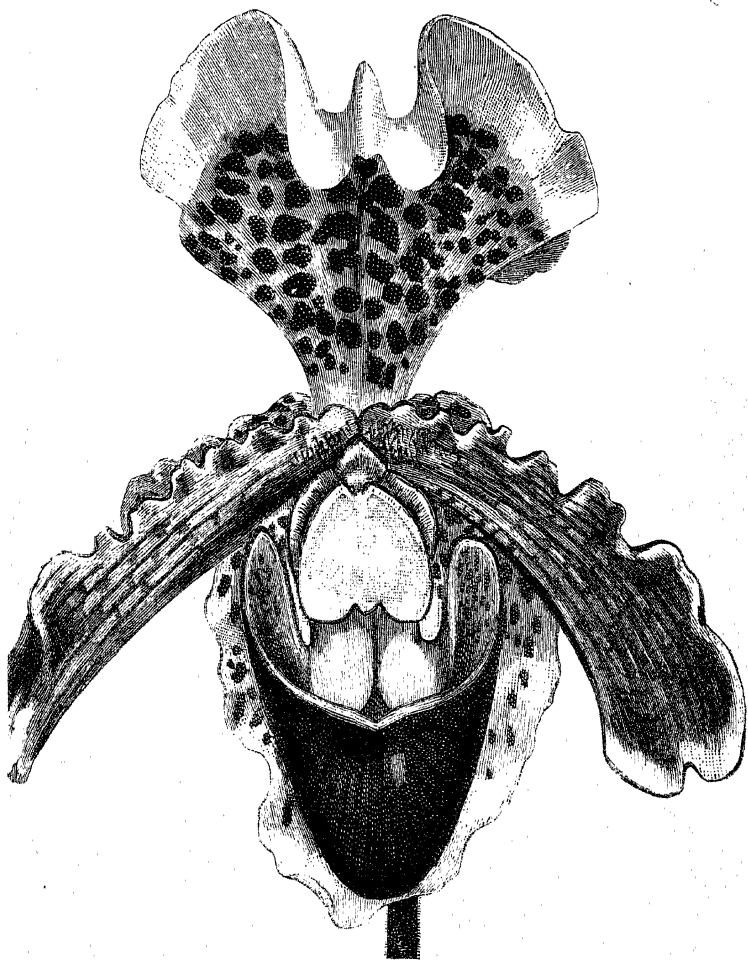


FIG. 143.—*CYPRIPEDIUM INSIGNE*, 'HAREFIELD HALL VARIETY.' (*Journal of Horticulture*.)

Trevor Lawrence, Bart. (gr. Mr. W. H. White). A fine hybrid, of carmine crimson colour. Parentage unrecorded, but the labellum suggests *C. labrosa* on the one side.

To *Lælia* × *Digbyano-purpurata* (*purpurata* ♀ *Digbyana* ♂), (votes, unanimous). A fine flower, in form and size equal to *L. purpurata*. Sepals and petals bluish white; front of lip purplish crimson; margin slightly fringed.

Botanical Certificate.

To *Lycaste lasioglossa*, from F. W. Moore, Esq., Royal Botanic Gardens, Glasnevin, Dublin. Sepals reddish brown; petals and lip yellow, the latter hairy and bearing reddish spots.

Cultural Commendation.

To Mr. H. Holbrook (gr. to Elijah Ashworth, Esq.), for a grand example of *Cypripedium insigne* 'Harefield Hall variety.'

To Mr. Geo. Cragg (gr. to W. C. Walker, Esq., Percy Lodge, Winchmore Hill), for *Dendrobium aureum*, bearing a great number of flowers.

Other Exhibits.

Messrs. Jas. Veitch showed *Lælia* × 'Omen' (*autumnalis* ♀ *purpurata* ♂); *Lælio-Cattleya* × 'Frederick Boyle' (*C. Trianæi* ♀ *L. anceps* ♂); *L.-C.* × 'F. Boyle' var. *Amœna* (*L. anceps* Veitchii ♂ *C. Trianæi* ♀); *Cattleya* × 'Ariel' (*Bowringiana* ♀ *Gaskelliana* ♂); and other hybrids.

Captain G. W. Law-Schofield (gr. Mr. Shill) showed *Cypripedium* × 'Norma.'

Sir William Marriott, Down House, Blandford (gr. Mr. Denny), showed *Lælio-Cattleya* × (*L.-C.* × *elegans* × *C. Warscewiczii*), identical with *L.-C.* × 'Henry Greenwood'; and *Cattleya* × (*Mendelii* × *Warscewiczii*).

Messrs. Sander showed various Orchids.

De B. Crawshay, Esq. (gr. Mr. S. Cooke), showed *Odontoglossum* × *Ruckerianum platycheilum*.

G. C. Robertson, Esq., Nottingham, sent *Cymbidium* × *Winnianum*.

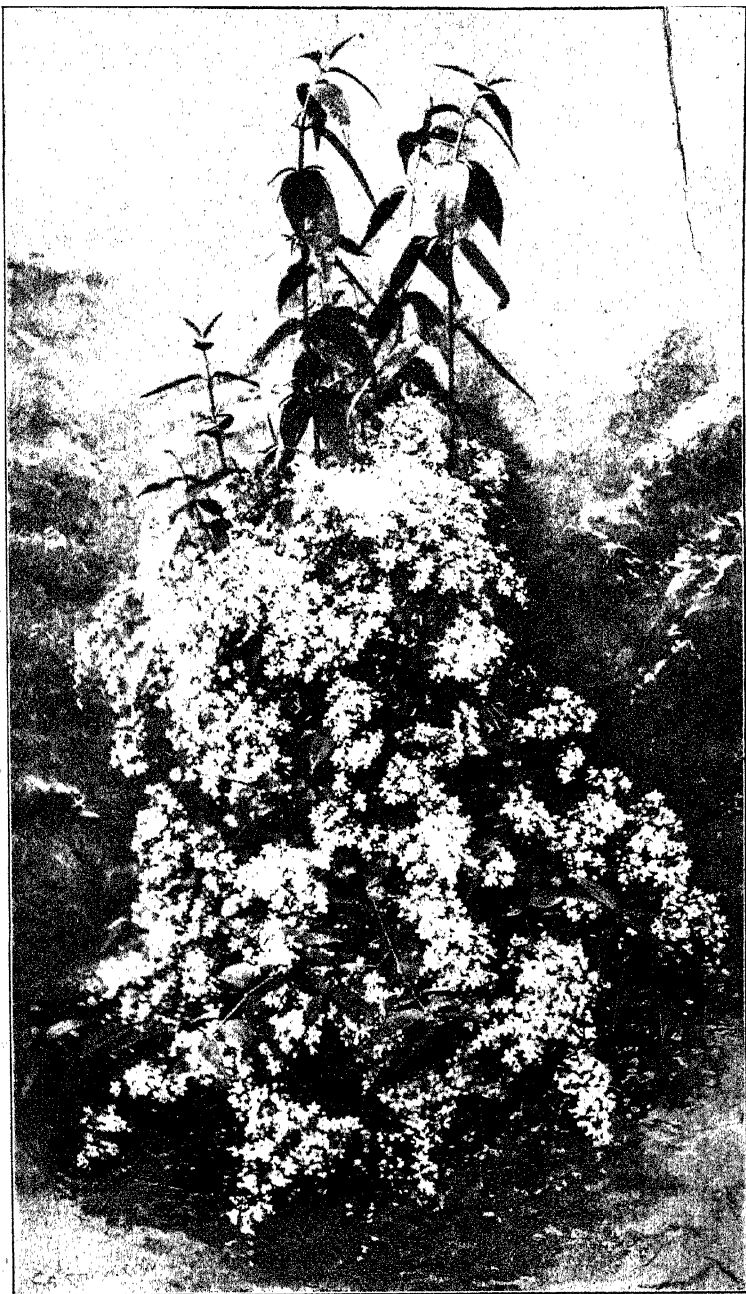


FIG. 144.—*DEUTZIA CORYMBIFLORA*. (*Gardeners' Chronicle*.)

April, 1899.

Royal Horticultural Society.

NOTICES TO FELLOWS.

Letters.—All letters on all subjects should be addressed, ^{to the} Secretary, Royal Horticultural Society, 117 Victoria Street, Westminster.

Telegrams.—"HORTENSIA, LONDON" is sufficient address.

Plants.—A list of Plants to choose from was sent to every Fellow on January 10, and the ballot for order of distribution was made on March 1. All Fellows will participate in the distribution in the March *following* their election. No distribution can be made later in the year, though from the large number of Fellows to be served it is often the end of April before the March distribution is completed.

Subscriptions.—All Subscriptions fall due on January 1 of each year. To avoid the inconvenience of remembering this, Fellows can now *compound* by the payment of one lump sum in lieu of all further annual payments; or they can, by application to the Society, obtain a form of instruction to their bankers to pay for them every January 1. Fellows whose subscriptions remain unpaid are debarred from all the privileges of the Society; but their subscriptions are nevertheless recoverable at law, the Society being incorporated by Royal Charter.

Meetings and Shows, 1899, remaining.—The following are the dates:—April 18; May 2, 16; Temple Show, May 31, June 1, 2; June 13, 27; July 11,* 12,* 25; August 15, 29; September 12, 26; Fruit Show, Crystal Palace, September 28, 29, 30; October 10, 24; November 7, 21; December 5, 19; January 9, 23, 1900.

* July 11 at Chiswick, July 12 at 117 Victoria Street.

Notice of Meetings and Shows.—A reminder of every Show will be sent, in the week preceding, to any Fellow who will send to the R.H.S. Office, 117 Victoria Street, Westminster, 24 halfpenny postcards for 1899, *ready addressed to himself*.

Temple Show, May 31, June 1, 2.—Fellows of the Society are admitted free on showing their Tickets. N.B.—Each *Personal Pass* is strictly non-transferable, and will admit the Fellow to whom it belongs (but no one else).

The Public are admitted by purchased Tickets:—On Wednesday, May 31, from 12.30 to 5 P.M., 7s. 6d.; from 5 P.M. to 7 P.M., 2s. 6d. On Thursday, from 10 A.M. to 7 P.M., 2s. 6d. On Friday, from 10 A.M. to 6 P.M., 1s.

To avoid the inconvenience of crowding, Tickets may be obtained on or *before* May 29, at the Society's Office, 117 Victoria Street, S.W., or at the Treasurer's Office, Inner Temple.

The Society's Offices at Westminster will be *closed* on the days of the Show, and consequently no letters should be addressed there on the previous day.

On the days of the Show, Tickets will only be on sale near the entrance to the Gardens (Thames Embankment Gate).

Members of Affiliated Societies, and *bonâ fide* Gardeners, may obtain 2s. 6d. Tickets for 1s., which will admit them on Thursday. These tickets *can only be obtained* on or before May 29 *from the Society's Office*, 117 Victoria Street, S.W., and a large stamped and directed envelope must be sent with Postal Order in every case. Members of Affiliated Societies *must apply only through the Secretary of their own Society* if they wish to take advantage of this privilege.

June 27.—The Great Rose Show at the Drill Hall. For Schedule of prizes, see book of "Arrangements, 1899," page 65.

July 11, 12.—An International Conference on Hybrids, with Exhibition, will be held at Chiswick on July 11 at 2.15. The Conference (not the Exhibition) will be continued on July 12 at 117 Victoria Street, S.W., at 2.15 P.M.

Dinner of the Society.—On July 12 a banquet of the Society will be given at 6.30 for 7 P.M., at the Whitehall Rooms, Hôtel Métropole. *Evening Dress*. All Fellows can, as far as space will permit, obtain Tickets (price 21s. each), for ladies or

gentlemen, by applying (with cheque or postal order) to the Secretary, 117 Victoria Street, before July 1. And it is hoped that as many as possible will unite in thus doing honour to the Foreign and distinguished guests attending the Conference on Hybrids.

Great Show of British-grown Fruit, September 28, 29, 30.—Fellows are particularly requested to subscribe a small sum towards the Prizes, as £100 must be raised immediately. Send to the Secretary. Schedules of the show can now be obtained.

Lectures, &c.—Any Fellows willing to Lecture or to communicate Papers on interesting subjects are requested to communicate with the Secretary.

Binding the Journal.—There are four separate parts of Vol. XXII. The title page and table of contents, which will be found enclosed in the present part, should be placed at the commencement of the whole volume. Then should follow all the four parts of the "Journal" proper, which is paged in figures from 1 to 498. After this should come the four parts of "Extracts from the Proceedings," which are paged in letters from i to ccxxxii, finishing with the Index.

New Fellows.—The Secretary makes a special appeal to all Fellows to assist in promoting the welfare of the Society by doing all in their power to introduce new Fellows.

Advertisements.—Fellows are reminded that the more they can place their orders with those who advertise in the Society's publications the more likely others are to advertise also, and in this way the Society may be indirectly benefited.

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